Range Plant Community Types and Carrying Capacity for the Subalpine and Alpine Subregions

Alberta

Sustainable Resource Development
Public Lands and Forests Division

RANGE PLANT COMMUNITY TYPES AND CARRYING CAPACITY FOR THE SUBALPINE AND ALPINE SUBREGIONS

Third approximation

(Please note this edition is a revision of the 1st and 2nd approximation of the Range Plant Community types and carrying capacity for the Subalpine and Alpine subregions. Pub. No. T/438 and T/034)

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Abstract

The Subalpine subregion is a Rocky Mountain altitudinal vegetation zone extending from an elevation of 1575 m to 2175 m at its southernmost occurrence and 1365 m to 2000 m near Grande Cache (Strong 1992). The valley bottoms of the subalpine are extensively utilized for recreational horseback riding and commercial trail riding operations. As a result many of the grass and shrublands around the back country campsites are extensively utilized by horses. This utilization has an impact on the vegetation which can be detrimental to the wildlife populations in the area. In the southern part of the province (south and west of Calgary) extensive areas of the subalpine is also provide forage for cattle. Despite the importance of these vegetation types for wildlife and livestock use there is little information on their ecology. The lack of information makes it difficult to develop management prescriptions for multiple use. The Alpine subregion which occurs above the upper climatic forest-line in the Rocky Mountains (Strong 1992) overlaps with many of the subalpine community types and therefore can be important locally for wildlife. As a result this guide was developed for the Subalpine and Alpine subregions in order to provide a framework that will easily group the vegetative community types. It is hoped this classification system can be used by field staff to assess the ecology of the sites and develop management prescriptions on lands within each region. This guide represents the analysis of 704 plots described in the Subalpine subregion and 134 grass and shrubland plots described in the Alpine subregion. In the Subalpine subregion it was found there was distinct differences between the grassland and shrubland community types between the Central and Northern Foothills (West of Rocky Mountain house and Hinton), the Central and Northern Rocky Mountains (Banff and Jasper National Parks) and the Southern Rocky Mountains (southwest of Calgary). As a result the Subalpine was prestratified into 3 subdivisions. These types are split into:

Subalpine	
Central and Northern Foothills	
A. Native grasslands	17 community types
B. Native shrublands	11 community types
Central and Northern Rocky Mountains	
A Native grasslands	9 community types
B. Native shrublands	8 community types
Southern Rocky Mountains	
A. Native grasslands	20 community types
B. Native shrublands	9 community types
C. Grazed grasslands	14 community types
D. Deciduous	10 community types
E. Conifer	5 community types
F. Cutblocks	1 community type
Alpine	
A. Native grasslands and shrublands	7 community types

The dominant plant species, canopy cover, environmental conditions, response to grazing, forage production and carrying capacity are outlined for each type.

Acknowledgements

The creation of this report would not be possible without the data collected in other projects. We would like to acknowledge Parks Canada for allowing us to use data from the Ecological Land Classification of Banff and Jasper National Parks (Holland and Coen 1982). Much of the grass and shrubland vegetation data collected by Ian Corns and Peter Achuff for this project were incorporated into this guide. We would also like to acknowledge the Alberta Conservation Association and Corporate Management Service. They provided funding for the study of bighorn sheep winter range in Southern Alberta and backcountry horse use and elk carrying capacity in the Panther Corners. The vegetation data from these studies were also included in this guide. Finally appreciation and thanks go out to all members and former members of Land and Forest Service who were involved in data collection.

Introduction

The province of Alberta is covered by a broad spectrum of vegetation regions from prairie in the South, to alpine vegetation in the mountains and dense forests in the Central and Northern part of the province. These broad vegetation regions have been classified into 6 regions and 20 subregions (Dept. of Environmental Protection 1994). Each of the 20 subregions consists of groups of ecological sites and plant communities which are influenced by environmental conditions and human impacts. Ecological sites are complex and evolving systems, with a flow of energy and matter, which is influenced by the interaction of climate, landforms, soils, vegetation and animals (Archibald et al. 1996). Intensive management of these ecological sites requires the ability to recognize and classify the vegetative communities that have similar productivities and respond to disturbance in the same way.

The purpose of this guide was to develop a framework that would easily group the grassland and shrubland community types in the Subalpine and Alpine subregions of the province. It is hoped this classification system can be used by field staff to assess the ecology of the sites and develop management prescriptions on lands within the region. This guide supplements the work done by Beckingham et al. (1996), Beckingham and Archibald (1996) and Archibald et al. (1996) on the forested community types in the Subalpine subregion and follows their classification hierarchy (ecosite, ecosite phase, plant community), but uses different terminology in an effort to be consistent with historic rangeland classification systems. Their guides are a good description of the forested community types found within the subregions, but it does not include forage production values and stocking rates. It also does not provide a description of the native shrubland and grassland communities which are utilized by livestock and horses at the lower elevations in this subregion.

Climate

Subalpine subregion

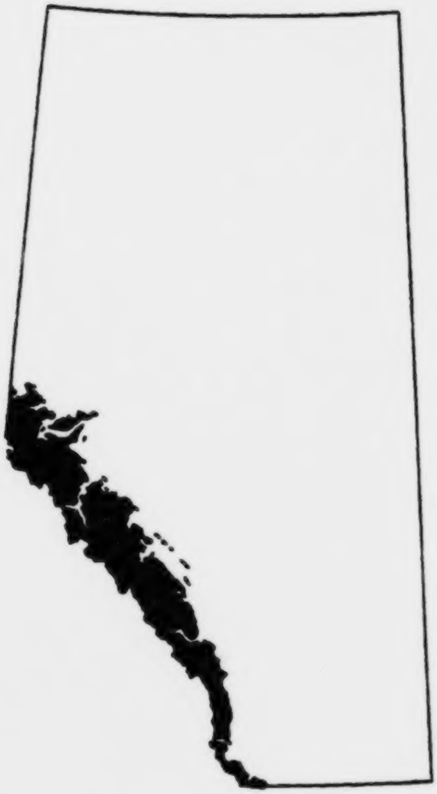
The subalpine subregion is a Rocky Mountain altitudinal vegetation zone with its upper boundary formed by the Alpine subregion, whereas the lower boundary abuts the Montane, Foothills parkland and the Upper Foothills subregions. In Alberta, the subalpine extends from 1525 m to 2175 m at its southernmost occurrence and from 1360 m to 2000 m in the vicinity of Grande Cache (Strong 1992). The subalpine has a cordilleran climate characterized by snowy, cold winters and showery cool summers. Annual precipitation ranges from 329 mm to 916 mm, with maximum precipitation falling during July. The subalpine receives more precipiatiton during the winter months than any subregion (Strong 1992). The mean summer temperatures averages 9.4 °C and winter temperatures typically average -8.9 °C with December and January being the coldest months. The cold winter temperatures help to maintain the snowpack which makes this an important watershed area.

The majority of the vegetation is dominated by seral lodgepole pine forests at lower elevations with Engelmann spruce and subalpine fir forests being more common at higher elevations. At timberline dwarf spruce, subalpine and whitebark pine are typical of the transition to the Alpine subregion. Imperfectly drained bottomlands are dominated by willow, bog birch, sedge, tufted hairgrass and california oatgrass species and the steep south facing slopes are often dominated by fescue, hairy wildrye, wheatgrass and junegrass species.

Alpine subregion

The Alpine subregion occurs above timberline in the Rocky Mountains of Alberta. Elevationally, alpine occupies areas greater than 2150 m in southern Alberta and declines to 2000 m in more northern portions. It is felt that the total annual precipitation is at least equal to the Subalpine subregion, which potentially makes the Alpine the wettest subregion in Alberta (Strong 1992). Summer temperatures are the coldest in Alberta with July mean temperatures averaging 10 °C. Freezing temperatures occur in all months of the year. Winter temperatures are probably colder than the subalpine subregion with temperatures probably never going above freezing for the whole winter. The cold temperatures help to maintain the snowpack for much of the year. Wind is also extremely important climatic factor in the Alpine. Although, precipitation is abundant the strong winds likely result in very large moisture deficits (Strong 1992).

The Alpine is characterized by low growing vegetation, which helps to protect the vegetation from the dessicating winds, and allows the plants to gain heat from the ground. Glaciers occur at the higher elevations where snow accumulation exceeds melt.



Map 1. Location of Subalpine and Alpine subregions in Alberta

Approach and Methods of Classification

Approach: Ecological classification hierarchy and terminology

The system of classification in this guide was initially based on the community type approach of Mueggler (1988). Mueggler's system was chosen over the habitat type approach (Daubenmire 1952) or ecosystem association approach (Corns and Annas 1986) because it could classify plant communities irregardless of their successional status. However, as the philosophy of rangeland health and proper functioning condition of a site evolved, it became apparent (through data analysis) that there was a need to also organize the various plant communities based on their response to disturbance (i.e. disturbance vs. natural succession) within an area under similar environmental influences.

It was determined that the ecosystem classification system developed by Corns and Annas (1986) and Beckingham et al. (1996) could accommodate this additional requirement. Thus, the new system developed for rangelands is a combination of Mueggler (1988) and Beckingham et al. (1996). Consequently, this guide adopts a similar ecological unit classification hierarchy (**ecosite, ecosite phase, plant community**). In an effort to first, link the hierarchical system with the historic rangeland system, and second, to create a provincially standardized rangeland approach, slightly different classification terminology was developed. The new terms **ecological site** and **ecological site phase** (replacing Beckingham et al.'s [1996] ecosite and ecosite phase terms respectively), provide subtle distinction to recognize the blending of the old systems and still be recognizable to readers familiar with the original terminology

Methods: Plant community classification

Sampling for this guide occurred within the Subalpine and Alpine subregions . This guide represents the analysis of 704 plots described in the Subalpine subregion and 134 grass and shrubland plots described in the Alpine subregion. The procedure for inventory of plots followed the Range Survey Manual (1992) and uses the **MF5 form**. A plot consisted of a 10 m x 10 m macroplot and ten randomly selected 1 m x 1 m microplots to record the canopy cover of shrubs and ten nested 20 cm x 50 cm microplots to record the canopy cover of forbs and grass. The data for each site was analyzed using the multivariate analysis techniques of classification and ordination. Classification is the assignment of samples to classes or groups based on the similarity of species. A polythetic agglomerative approach was used to group the samples. This technique assigns each sample to a cluster which has a single measure. It then agglomerates these clusters into a hierarchy of larger and larger clusters until finally a single cluster contains all the samples (Gauch 1982). Cluster analysis was performed in SAS and Euclidean distance was used as the Cluster Distance Measure and Ward's method was used in the Group Linkage Method. The groupings generated in cluster analysis were overlain on the site ordination to determine final groupings. Ordination was used to find relationships among species, communities and environmental variables. Ordination reduces the dimensionality of the data to 1-3 most important axes to which environmental gradients can be assigned. The ordination technique used in the analysis of the data was DECORANA (Detrended Correspondence Analysis). DECORANA detrends and rescales the axes thereby reducing the arching and compression of axes problems associated with other ordination techniques (Reciprocal averaging, Principle Components Analysis). Once final groupings were determined on the ordination specific environmental variables can be assigned to the variation outlined on the ordination axes.

Plant community type summaries were generated in SAS, by averaging plant species composition, range in composition, and percent constancy of occurrence, among vegetation inventory plots which were part of a community type. Environmental data was subsequently sorted into the same plant community groupings to create the plant community descriptions outlined in this guide. The number of sample plots on which the description was based is also provided (e.g. n=16).

Range Management Concepts and Methods

Ecologically sustainable stocking rates

Ecologically sustainable stocking rates (ESSR) values are suggested for each plant community. These values reflect the maximum number of livestock (e.g. hectares(ha)/animal unit month(AUM)) that can be supported by the plant community given inherent biophysical constraints and the ecological goal of sustainable health and proper functioning of the plant community. When the ESSR is multiplied by the area (e.g. ha) of a plant community polygon the result is termed **ecologically sustainable carrying capacity (ESCC)**, and is expressed as AUMs. Often the ESCC must be adjusted for management factors (e.g. reduced livestock distribution), management goals (e.g. improve rangeland health, multiple use and values, etc.), drought conditions, and other natural phenomena impacting the site (e.g. forage quality, fire, pests, etc.). This adjusted/reduced value is the **ecologically sustainable grazing capacity (ESGC)**. The ESGC values are not provided in the plant community guide because the necessary adjustments are determined by the rangeland resource manager.

Suggested ESSR values were determined from a combination of clipping studies, long-term rangeland reference area data, estimated production, range health trends and historical grazing experience. In order to sustain ecological health and function of the plant community, the ESSR has been established by the resource manager and is based on the ecological, climatic and seasonal conditions for each community type. In determining ESSR the forage requirements for one Animal Unit (AU) has been set at 455 kg of dry matter per month. The remaining biomass production (carry over), is allocated for the maintenance of ecological functions (e.g. nutrient cycling, viable diverse plant communities, hydrological function, and soil protection, etc.) and plant community services (forage production, habitat maintenance, etc.). The allocation of biomass production in this manor is well established, and supported, by the scientific community and the amount required, varies with Natural Subregion (Holechek et al. 1995).

Rangeland Health

Range health is determined by comparing the functioning of ecological processes on an area (e.g. plant community polygon) of rangeland to a standard (i.e. RPC) described within an ecological site description. An ecological site is similar to the concept of **range site**, but a broader list of characteristics are described. An ecological site is defined by the Task Group on Unity and Concepts (1995) as, "*a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation*". This guide can be used to determine the appropriate **reference range plant community**, within an ecological site, for a rangeland health assessment.

Rangeland health assessments are utilized to make a rapid determination of the ecological status of rangeland. We use range health terminology (healthy, healthy with problems, or unhealthy), to rank the ability of rangeland to perform certain ecological functions. These functions include: net primary production, maintenance of soil/site stability, capture and beneficial release of water, nutrient and energy cycling and plant species functional diversity. For a detailed description on how to assess rangeland health for various plant communities please refer to "*Rangeland Health Assessment for Grassland, Forest and Tame Pasture*" (Adams et al. 2003). A general range health category (Healthy, Healthy with problems, Unhealthy) has been added to each community type description, which can be used as a guide when doing range health assessments.

Range management objectives tend to favor the later stages of plant succession (late-seral to potential natural community (PNC) or good to excellent range condition) (Adams et al. 2003). Late seral plant communities tend to be superior in the efficient capture of solar energy, in cycling of organic matter and nutrients, in retaining moisture, in supporting wildlife habitat values and in providing the highest potential productivity for the site. In contrast, early seral stages represent plant communities with diminished ecological processes, which are less stable and more vulnerable to erosion and invasion by weeds and non-native species. They also have diminished resource values for livestock forage production, wildlife habitat and watershed protection (Adams et al. 2003). Healthy rangelands perform important ecological functions and provide a broader suite of goods and services. In most cases these late seral plant communities are used as reference range plant community (RPC), but sometimes management goals influence the choice of RPC (e.g. a cut block to be maintained as untimbered rangeland).

How to use the guide

In the Subalpine subregion it was found there was distinct differences between the grassland and shrubland community types between the Central and Northern Foothills (the foothills west of Sundre, Rocky Mtn. House, Hinton and Grande Cache), the Central and Northern Rocky Mountains (mountains of Banff and Jasper National Park) and the Southern Rocky Mountains (foothills west of Calgary, Turner valley and areas south of Blairmore) (Strong and Thompson 1995). As a result the Subalpine was prestratified into 3 subdivisions. For the Subalpine first decide which area you are in then turn to the appropriate subdivision in the guide. The Alpine is generally all the vegetation types above timberline.

The plant community types in this guide were organized into the hierarchial ecosite and ecosite phase classification outlined in "Ecosites of West-Central Alberta and Southwestern Alberta" (Beckingham et al. 1996, Archibald et al. 1996), the community types in this guide are arranged by ecological sites (ecosite) and ecological site phase (ecosite phase) for West-Central Alberta (Table 1) and Southwestern Alberta (Table 4). **Ecological sites** are defined as ecological units that develop under similar environmental influences (climate, moisture and nutrient regime). An **Ecological Site Phase** is a subdivision of the ecological site based on the dominant species in the canopy. Table 1 is a reproduction of Figure 20 in the Ecosites of West-Central Alberta guide and table 4 is a reproduction of Figure 20 in the Ecosites of Southwestern Alberta guide with the community types in this guide highlighted. For the most part the ecological sites (ecosites) and ecological site phases (ecosite phases) are the same, particularly for the forested community types, but a number of new ecological sites and ecological site phases had to be created for the grass and shrubland community types (Table 1). The ecological sites include (bb)(subxeric/poor) yellow mountain avens, and (dd)(subhygric/medium) bog sedge meadow. The ecological site phases include (b2) bearberry grassland, (bb1) yellow mtn. avens, (c4) hairy wildrye grassland, (d4) California oatgrass, (d5) willow, (d6) grouseberry, (dd1) sedge-bog sedge, (dd2) shrubland, (e3) grass meadow, (g2) willow and (h3) grass bog for West-Central Alberta (Table 1). In Southwestern Alberta the new ecological sites include (cc) (submesic/rich) rough fescue, and (i) fen. The ecological site phases included (a2) grassland, (b2) grassland, (b4) bearberry-Aw, (c2) yellow mtn. avens, (cc1) rough fescue, (cc2) shrubland, (cc3) forb meadow, (e7) shrubland, (f3) thimbleberry Aw, (f4) shrubby seepages, (i1)shrub fen, (i2) graminoid fen and (i3) treed fen (Table 4). The "Successional Community Types" category outlines the successional sequence the community type will undergo with increased grazing pressure. For a detailed description of the forested community types in the Subalpine please refer to the work done by Beckingham et al. (1996), Beckingham and Archibald (1996) and Archibald et al. (1996). The dominant plant species, canopy cover, environmental conditions, response to grazing, forage production and carrying capacity of the grasslands and shrublands for the Subalpine and Alpine subregions are outlined in this guide.

Table 1. Ecological site, ecological site phases and community types for the Subalpine subregion of West-Central Alberta (adapted from Beckingham et al. 1996)(Reference range plant community types are described in this guide, Forested plant communities are outlined in guide to Ecosites of West-Central Alberta)

Ecological Site	**Ecological Site Phase**	**Forested Plant Community Type**	**Reference Range Plant Community**	**Successional Community Types**
a grassland (subxeric/medium)	a1 a1 shrubby grassland	a1.1 bearberry grassland	SACFA11 Blunt sedge-Junegrass/Bearberry	
		a1.2 willow-dwarf birch grassland	SACMB5 Bog birch/Juniper	
	a2 graminoid grassland	a2.1 Bellard's kobresia-hairy wild rye grassland	SACFA14. White Mtn. Avens/Bog sedge SACMA7 Northern wheatgrass SACFA10 Sedge-Hairy wildrye SACFA12 Fringed sage/Sedge-Junegrass	
b bearberry/lichen (subxeric/poor)	b1 bearberry/lichen Pl	b1.1 Pl/bearberry/lichen		
		b1.2 Pl/bog cranberry/lichen		
		b1.3 Pl/crowberry/lichen		
	b2 bearberry grassland		SACMA4 Bearberry -Juniper	
bb yellow mtn. avens (submesic/poor)	bb1 yellow mtn. avens		SACMA9 Yellow Mountain avens	
c hairy wild rye (submesic/medium)	c1 hairy wild rye Pl	c1.1 Pl/Canada buffalo-berry/hairy wild rye		
		c1.2 Pl/juniper-bearberry/hairy wild rye		

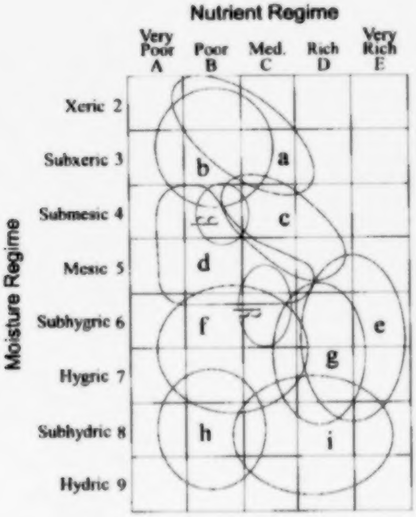
		c1.3 P1/green alder/hairy wild rye		
		c1.4 P1/hairy wild rye/feather moss		
	c2 hairy wild rye P1-Aw	c2.1 P1-Aw/hairy wild rye		
	c3 hairy wild rye Se	c3.1 Se/Canada buffalo-berry/hairy wild rye		
		c3.2 Se/juniper-bearberry/hairy wild rye		
		c3.3 Se/willow/hairy wild rye		
		c3.4 Se/hairy wild rye/feather moss		
	c4 hairy wildrye grassland		SACMA3 Shrubby cinquefoil/Hairy wildrye SACMA5 Junegrass-Hairy wildrye-Brome SACMA6 Hairy wildrye/Bearberry-Juniper SACFA9 Rough fescue-H. wildrye-Sedge	
d rhododendron-mesic (mesic/medium)	d1 rhododendron-mesic P1	d1.1 P1/rhododendron/feather moss		
		d1.2 P1/false azalea/feather moss		
		d1.3 P1/tall bilberry/feather moss		
		d1.4 P1/Labrador tea/feather moss		
		d1.5 P1/green alder/feather moss		
		d1.6 P1/feather moss		
	d2 rhododendron-mesic Se	d2.1 Se/rhodedendron/feather moss		
		d2.2 Se/false azalea/feather moss		
		d2.3 Se/tall bilberry/feather moss		
		d2.4 Se/Labrador tea/feather moss		

		d2.5 Se/green alder/feather moss		
		d2.6 Se/subalpine fir/feather moss		
		d2.7 Se/feather moss		
	d3 rhododendron-mesic Fa	d3.1 Fa/rhododendron/feather moss		
		d3.2 Fa/false azalea/feather moss		
		d3.3 Fa/tall bilberry/feather moss		
		d3.4 Fa/subalpine fir/feather moss		
		d3.5 Fa/feather moss	SACMB8 Subalpine fir	
	d4 California oatgrass		SACFA8 California oatgrass-Sedge SACMA1 Bog sedge-California oatgrass SACMA8 Alpine bluegrass	
	d5 Willow		SACFB6 Willow-Bog birch/California oatgrass	
	d6 grouseberry		SACMB7 Grouseberry-Juniper	
dd bog sedge meadow (subhygric/medium)	dd1 sedge-bog sedge		SACFA13 Sedge-Bog sedge-Tufted hairgrass	
	dd2 shrubland		SACFB8 Willow-Bog birch/Bog sedge-Sedge SACFB9 Bog birch-Willow/Rough fescue SACFB10 Bog birch/Rough fescue-Bog sedge SACMB4 Willow-Bog birch/Bog sedge	

e meadow (subhygric/very rich)	e1 shrubby meadow	e1.1 willow-dwarf birch meadow	SACFB3 Willow/Graceful sedge SACFB4 Willow-Bog birch/Tufted hairgrass SACFB7 Willow-Bog birch/Hairy wildrye SACFB11 Willow/Fringed brome-Sedge SACMB2 Willow/Sedge SACMB3 Willow-Bog birch/Hairy wildrye SACMB6 Willow/Forb	SACFB5 Willow-Bog birch/Clover-Dandelion
	e2 forb meadow	e2.1 meadow rue meadow	SACMA2 Forb meadows	
	e3 grass meadow		SACFA4 Tufted hairgrass-Sedge SACFA17 Fireweed-Meadow rue/Sedge-H wildrye	SACFA5 Sedge-Tufted hairgrass SACFA6 Sedge-Rocky Mtn. fescue-Alpine timothy SACFA7 Sedge-Slender wheatgrass-Fringed brome/Forb SACFA16 Kentucky bluegrass-Sedge/Dandelion SACFA15 Creeping red fescue-Sedge
f rhododendron-subhygric (subhygric/medium)	f1 rhododendron-subhygric P1	f1.1 P1/rhododendron/feather moss		
		f1.2 P1 false azalea/feather moss		
		f1.3 P1/Labrador tea/feather moss		

	f2 rhododendron-subhygric Se-Fa	f2.1 Se-Fa/rhododendron/feather moss		
		f2.2 Se-Fa/false azalea/feather moss		
		f2.3 Se-Fa/Labrador tea/feather moss		
g horsetail (hygric/rich)	g1 horsetail Se	g1.1 Se/willow/horsetail		
		g1.2 Se/feather moss		
	g2 willow		SACFB2 Willow/Horsetail	
h bog (subhydric/poor)	h1 treed bog	h1.1 Sb/cloudberry/feather moss-peat moss		
	h2 shrubby bog	h2.1 Labrador tea/cloudberry/peat moss		
	h3 grass bog		SACFA2. Tufted bulrush SACFA3. Sedge-Cottongrass	
i fen (subhydric/rich)	i1 treed fen	i1.1 Sb-Se/willow/sedge/peat moss		
		i1.2 Sb-Se/willow-dwarf birch/sedge/golden moss		
	i2 shrubby fen	i2.1 willow/sedge/tufted moss-peat moss	SACFB1 Willow-Bog birch/Water sedge SACMB1 Willow/Water sedge	
		i2.2 willow-dwarf birch/sedge/peat moss-golden moss		
		i2.3 dwarf birch/sedge/peat moss-golden moss		
	i3 graminoid fen	i3.1 sedge fen	SACFA1. Water sedge-Beaked sedge	

Figure 1. Edatopic grid for the Central and Northern Foothills and Central and Northern Mountains of the Subalpine subregion.


Nutrient Regime
Very Poor A
Poor B
Med. C
Rich D
Very Rich E
Moisture Regime
Xeric 2
Subxeric 3
Submesic 4
Mesic 5
Subhygric 6
Hygric 7
Subhydric 8
Hydric 9
a
b
c
d
e
f
g
h
i

Ecological sites

a grassland
(subxeric/medium)
b bearberry/lichen
(subxeric/poor)
bb yellow mtn. avens
(submesic/poor)
c hairy wildrye
(submesic/medium)
d rhododendron-mesic
(mesic/medium)
dd bog sedge meadow
(subhygric/medium)
e meadow
(subhygric/very rich)
f rhododendron-subhygric
(subhygric/medium)
g horsetail
(hygric/rich)
h bog
(subhydric/poor)
i fen
(subhydric/rich)

b2 bearberry grassland (n=14)

CHARACTERISTIC SPECIES

Trees
[2] Aspen

Shrubs
[2] Willow
[2] White mtn. avens
[3] Shrubby cinquefoil
[9] Ground juniper

Forbs
[19] Bearberry
[1] White camas
[1] Strawberry
[1] Yarrow

Graminoids
[1] Sedge
[1] Spiked trisetum
[2] Hairy wildrye

SITE CHARACTERISTICS

Moisture regime: subxeric, mesic
Nutrient regime: poor, medium
Topographic position: upper slope
Slope: (16-30)(46-70)
Aspect: southerly

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form: mor
Surface texture: SL,S,L
Effective texture: SL,LS
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: M,GF
Soil subgroup:, E.DYB, O.HFP, BR.GL, O.EB

COMMUNITY TYPES

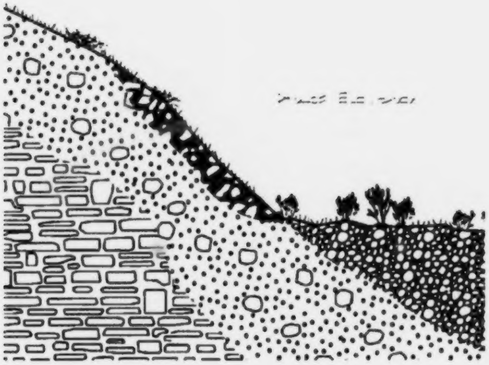
SACMA4. Bearberry-Juniper (n=14)

bb yellow mtn. avens (n=4)

subxeric/medium

GENERAL DESCRIPTION

This ecosite is located on recent fluvial and glacialfluvial landforms with gentle slopes. The soils are poorly developed gravels and are rapidly drained. Yellow mountain avens, bearberry, juniper and junegrass are typical of these early successional river flats. The poor soil conditions limits the forage productivity and amount of regrowth after grazing. This ecosite should be rated as non-use range.



SUCCESSIONAL RELATIONSHIPS

Yellow mtn. avens generally dominates this community in the early successional stages. Succession in the absence of disturbance will be to balsam poplar, Engelmann spruce and subalpine fir.

INDICATOR SPECIES

yellow mtn. avens
willow
silverberry
juniper
showy locoweed
bearberry
alpine fireweed
sedge

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic
Nutrient regime: poor, medium
Topographic position: floodplain
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mor
Surface texture: SL,SiL
Effective texture: SL,
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: F,GF
Soil subgroup:, O.R

ECOSITE PHASES

bb1 yellow mtn. avens (n=4)

bb1 yellow mtn. avens (n=4)

SACMA9. Yellow mountain avens (n=4)

CHARACTERISTIC SPECIES

Trees

[2]	Engelmann spruce
[1]	Subalpine fir
[1]	White spruce

Shrubs

[5]	Willow
[1]	Buffaloberry
[50]	Yellow mtn. avens
[1]	Shrubby cinquefoil

Forbs

[1]	Alpine fireweed
[1]	Showy locoweed
[1]	Alpine goldenrod

Graminoids

[1]	Sedge
[1]	Spiked trisetum

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic
Nutrient regime: poor, medium
Topographic position: floodplain
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mor
Surface texture: SL,SiL
Effective texture: SL,
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: F,GF
Soil subgroup:, O.R

COMMUNITY TYPES

c4 hairy wildrye grassland (n=81)

CHARACTERISTIC SPECIES

Shrubs
[2] Juniper
[10] Shrubby cinquefoil

Forbs
[9] Bearberry
[2] Showy locoweed
[2] Strawberry
[1] Old man's whiskers
[1] White mtn. avens
[1] Yellow hedysarum

Graminoids
[5] Rough fescue
[15] Hairy wildrye
[5] Sedge
[5] Junegrass

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic,
Nutrient regime: medium
Topographic position: upper slope
Slope: (16-30)(47-70)
Aspect: southerly

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: no data
Surface texture: SiL
Effective texture: SL,
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: M
Soil subgroup:, O.R, O.EB

COMMUNITY TYPES

SACMA3 Shrubby cinquefoil/Hairy wildrye (n=5)
SACMA5 Junegrass-Hairy wildrye-Brome (n=19)
SACMA6 Hairy wildrye/Bearberry-Juniper (n=44)
SACFA9 Rough fescue-Hairy wildrey-Sedge(n=13)

d4 california oatgrass grassland (n=7)

CHARACTERISTIC SPECIES

Shrubs
[11] Willow
[13] Shrubby cinquefoil

Forbs
[5] Bearberry
[3] Veiny meadow rue
[8] Strawberry
[2] Yarrow
[2] Slender blue beardtongue
[1] Fireweed

Graminoids
[30] California oatgrass
[3] Hairy wildrye
[8] Sedge
[9] Bog sedge
[15] Alpine bluegrass

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric, submesic,
Nutrient regime: medium, rich, poor
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: no data
Surface texture: SiL, L
Effective texture: SL, SiL, L
Depth to Mottles/Gley: none
Drainage: mod. well, well
Parent material: M
Soil subgroup:, O.R, O.EB, BR.GL

COMMUNITY TYPES

SACFA8 California oatgrass-Sedge (n=5)
SACMA1 Bog sedge-California oatgrass (n=1)
SACMA8 Alpine bluegrass (n=1)

d5 willow (n=19)

CHARACTERISTIC SPECIES

Shrubs
[30] Willow
[7] Bog birch

Forbs
[1] Graceful cinquefoil
[1] Veiny meadow rue
[9] Strawberry
[2] Yarrow
[2] Globeflower
[1] Wandering daisy

Graminoids
[24] California oatgrass
[4] Mountain timothy
[10] Sedge
[1] Slender wheatgrass
[1] Spiked trisetum

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric, submesic,
Nutrient regime: medium, rich, poor
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: no data
Surface texture: SiL, L
Effective texture: SL, SiL, L
Depth to Mottles/Gley: none
Drainage: mod. well, well
Parent material: M
Soil subgroup:, O.R, O.EB, BR.GL

COMMUNITY TYPES

SACFB6 Willow-Bog birch/California oatgrass(n=19)

d5 grouseberry (n=4)

CHARACTERISTIC SPECIES

Trees
[1] Subalpine fir

Shrubs
[1] Willow
[14] Grouseberry
[5] Ground juniper
[1] Crowberry

Forbs
[12] Fireweed
[3] Small lv'd everlasting
[3] Strawberry
[2] Yarrow

Graminoids
[6] California oatgrass
[1] Sedge
[7] Spiked trisetum

SITE CHARACTERISTICS

Moisture regime: mesic, submesic,
Nutrient regime: medium
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: no data
Surface texture: SiL, L
Effective texture: SL, SiL, L
Depth to Mottles/Gley: none
Drainage: mod. well, well
Parent material: M
Soil subgroup:, O.R, O.EB, BR.GL

COMMUNITY TYPES

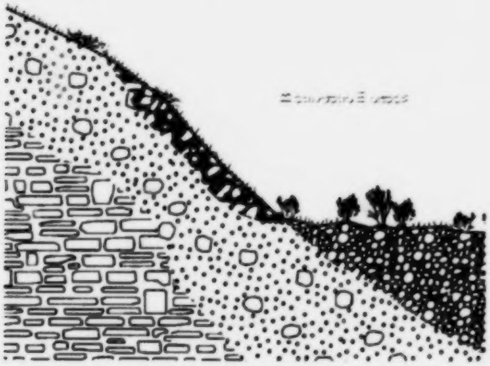
SACMB7 Grouseberry-Juniper (n=4)

dd bog sedge meadow (n=30)

subhygric/medium

GENERAL DESCRIPTION

This ecosite is located on moist well drained lowland sites adjacent to rivers and streams at higher elevations in the Central and Northern Foothills of the Subalpine. The presence of bog sedge appears to indicate the transition to the higher Alpine subregion. Indeed, Oglivie (1969) described bog sedge dominated community types on windswept ridges at higher elevations in the Alpine subregion. The forage production of this community is only moderate. Perhaps, the higher elevation and colder climate which favours the growth of bog sedge limits total productivity of this site.



SUCCESSIONAL RELATIONSHIPS

Due to the nature of the site grasslands often remain the climax vegetation on these sites. In the absence of disturbance willow and bog birch often invade to form willow and bog birch dominated shrublands.

INDICATOR SPECIES

california oatgrass
bog sedge
rough fescue
tufted hairgrass
sedge
willow
bog birch
veiny meadow rue
sedge

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium, rich
Topographic position: floodplain
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-15)
Humus form: no data
Surface texture: L,SiL
Effective texture: SiL,
Depth to Mottles/Gley: none
Drainage: well, mod. well
Parent material: F,GF
Soil subgroup:, O.R, O.HR

ECOSITE PHASES

dd1 sedge-bog sedge(n=6)
dd2 shrubland(n=24)

dd1 sedge-bog sedge (n=6)

CHARACTERISTIC SPECIES

Shrubs
[1] Shrubby cinquefoil

Forbs
[7] Alpine goldenrod
[3] Graceful cinquefoil
[1] Strawberry
[5] Yarrow
[6] Alpine bistort

Graminoids
[20] Bog sedge
[40] Sedge
[13] Tufted hairgrass
[7] Hairy wildrye
[3] Rocky mtn. fescue

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-15)
Humus form: no data
Surface texture: SiL, L
Effective texture: SL, SiL, L
Depth to Mottles/Gley: none
Drainage: mod. well, well
Parent material: F
Soil subgroup:, O.R, O.HR

COMMUNITY TYPES

SACFA13 Sedge-Bog sedge-Tufted hairgrass (n=6)

dd2 shrubland (n=24)

CHARACTERISTIC SPECIES

Shrubs
[7] Willow
[30] Bog birch

Forbs
[1] Alpine goldenrod
[2] Graceful cinquefoil
[3] Old man's whiskers
[1] Yarrow
[1] Alpine bistort
[2] False dandelion
[2] Tall larkspur
[1] Larkspur

Graminoids
[17] Bog sedge
[10] Sedge
[7] Rough fescue
[1] Hairy wildrye
[1] California oatgrass

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-15)
Humus form: no data
Surface texture: SiL, L
Effective texture: SL, SiL, L
Depth to Mottles/Gley: none
Drainage: mod. well, well
Parent material: F
Soil subgroup:, O.R, O.HR

COMMUNITY TYPES

SACFB8 Bog birch/Bog sedge-Sedge (n=5)
SACFB9 Bog birch-Willow/Rough fescue(n=4)
SACFB10 Bog birch/Rough fescue-Bog sedge(n=1)
SACMB4 Willow-Bog birch/Bog sedge (n=14)

e3 grass meadow (n=19)

CHARACTERISTIC SPECIES

Shrubs
[2] Willow
[1] Bog birch
[1] Shrubby cinquefoil

Forbs
[3] Veiny meadow rue
[2] Graceful cinquefoil
[1] Old man's whiskers
[2] Yarrow
[1] Alpine bistort
[2] False dandelion
[2] Tall larkspur

Graminoids
[10] Tufted hairgrass
[10] Sedge
[2] Slender wheatgrass
[1] Hairy wildrye
[1] California oatgrass

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: rich, medium
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-15)
Humus form: mor, moder
Surface texture: SiL, L
Effective texture: SiL, L, CL, C, SiCL, SCL, LS
Depth to Mottles/Gley: (0-25)
Drainage: mod. well, well, poor
Parent material: F
Soil subgroup:, R.G, O.HG, O.HR, O.MB, CU.R

COMMUNITY TYPES

SACFA4 Tufted hairgrass-Sedge (n=18)
SACFA17 Fireweed-Meadow rue/Sedge-Hairy wildrye (n=1)

e3 grazed grass meadow (n=33)

CHARACTERISTIC SPECIES

Shrubs

[2] Willow
[1] Bog birch
[1] Shrubby cinquefoil

Forbs

[3] Veiny meadow rue
[2] Graceful cinquefoil
[1] Old man's whiskers
[2] Yarrow
[1] Alpine bistort
[2] False dandelion
[2] Tall larkspur
[3] Dandelion

Graminoids

[7] Tufted hairgrass
[10] Sedge
[2] Slender wheatgrass
[1] Hairy wildrye
[1] California oatgrass
[10] Creeping red fescue
[12] Kentucky bluegrass
[2] Rocky mtn. fescue

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: rich, medium
Topographic position: level, midslope
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-15)
Humus form: mor, moder
Surface texture: SiL, L
Effective texture: SiL, L, CL, C, SiCL, SCL, LS
Depth to Mottles/Gley: (0-25)
Drainage: mod. well, well, poor
Parent material: F
Soil subgroup:, R.G, O.HG, O.HR, O.MB, CU.R

COMMUNITY TYPES

SACFA5 Sedge-Tufted hairgrass(n=7)
SACFA6 Sedge-Rocky Mtn. fescue-Alpine timothy(n=6)
SACFA7 Sedge-Slender wheatgrass-Fringed brome/Forb(n=18)
SACFA15 Creeping red fescue-Sedge(n=1)
SACFA16 Kentucky bluegrass-Sedge/Dandelion(n=1)

g2 willow (n=4)

CHARACTERISTIC SPECIES

Shrubs
[30] Willow
[6] Bog birch

Forbs
[12] Variegated horsetail
[9] Common horsetail
[3] Showy everlasting

Graminoids
[6] Tufted hairgrass
[16] Sedge

SITE CHARACTERISTICS

Moisture regime: hygric, subhygric
Nutrient regime: rich, medium
Topographic position: level, midslope, toe
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: mor
Surface texture: humic, SiL, L,SiCL
Effective texture: humic, SiL, L, SCL, SC
Depth to Mottles/Gley: (0-25)(26-50)
Drainage: mod. well, poor, imperfect
Parent material: F, M, FL
Soil subgroup:, R.HG, O.R, T.H

COMMUNITY TYPES

SACFB2 Willow/Horsetail (n=4)

h3 grass bog (n=19)

CHARACTERISTIC SPECIES

Shrubs

[2]	Willow
[2]	Bog birch

Forbs

[1]	Elephant's head
[2]	Common horsetail
[1]	Woolly everlasting
[1]	Lanced leaved paintbrush

Graminoids

[8]	Tufted bulrush
[15]	Sedge
[3]	Cottongrass

SITE CHARACTERISTICS

Moisture regime: subhydric, hygric
Nutrient regime: medium, poor
Topographic position: depression
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (>80)
Humus form: peatymor
Surface texture: fibric
Effective texture: mesic
Depth to Mottles/Gley: (0-25)(26-50)
Drainage: poor, imperfect
Parent material: O
Soil subgroup:, T.M, FI.OC

COMMUNITY TYPES

SACFA2 Tufted bulrush (n=12)
SACFA3 Sedge-Cottongrass(n=7)

Results

The analysis of the 848 plots distinguished 111 community types. These types were split into 4 categories:

Subalpine

Central and Northern Foothills

A. Native grasslands	17 community types
B. Native shrublands	11 community types

Central and Northern Rocky Mountains

A Native grasslands	9 community types
B. Native shrublands	8 community types

Southern Rocky Mountains

A. Native grasslands	20 community types
B. Native shrublands	9 community types
C. Grazed grasslands	14 community types
D. Deciduous	10 community types
E. Conifer	5 community types
F. Cutblock	1 community type

Alpine

A. Native grasslands and shrulands	7 community types

The dominant plant species, canopy cover, environmental conditions, forage production and carrying capacity (when available) are outlined for each community type.

SUBALPINE SUBREGION

SUBALPINE SHRUB AND GRASSLAND ECOLOGY

The Subalpine subregion has highly variable ecological conditions. Much of the variation is the result of complex topography, with a strong ecotonal effect from the surrounding subregions. For instance the grasslands and shrublands of the foothills west of Sundre, Rocky Mtn. House, Hinton and Grande Cache are very similar to the tufted hairgrass, California oatgrass, sedge and rough fescue dominated grass and shrublands of the Upper Foothills subregion. This area is represented by the Central and Northern Foothills, an area dominated by morainal and residuum deposits, gentler slopes (16-45%) and Brunisolic and Luvisolic soils. The Central and Northern Foothills are transitional from the lower Upper Foothills subregion to the higher and steeper Central and Northern Rocky Mountains of the Subalpine subregion. The Central and Northern Rocky Mountains are typical of the morainal and talus deposits on steeper slopes (10-100%), with Brunisolic and Regosolic soils in Banff and Jasper National Parks. These areas are transitional from the lower Subalpine to the higher Alpine subregion. Many species such as bog sedge, heather spp., white mountain avens which are characteristic of alpine communities start to become predominant in these areas. Grasslands on steep, south-facing slopes are dominated by hairy wildrye, junegrass and shrubby cinquefoil.

In southern Alberta (west of Turner valley, south of Blairmore) the subalpine grasslands and shrublands are strongly influenced by the lower Montane subregion. Many of the grass species associated with the Montane (rough fescue, Parry oatgrass, Idaho fescue) dominate the south facing slopes of the Subalpine. These grasslands are very different from the hairy wildrye dominated community types found in the Central and Northern Rocky Mountains. The Southern Rocky Mountains are dominated by residuum, morainal and talus deposits on gentle to steep slopes (16-100%).

SUBALPINE SUBREGION

CENTRAL AND NORTHERN FOOTHILLS

NATIVE GRASSLANDS AND SHRUBLANDS

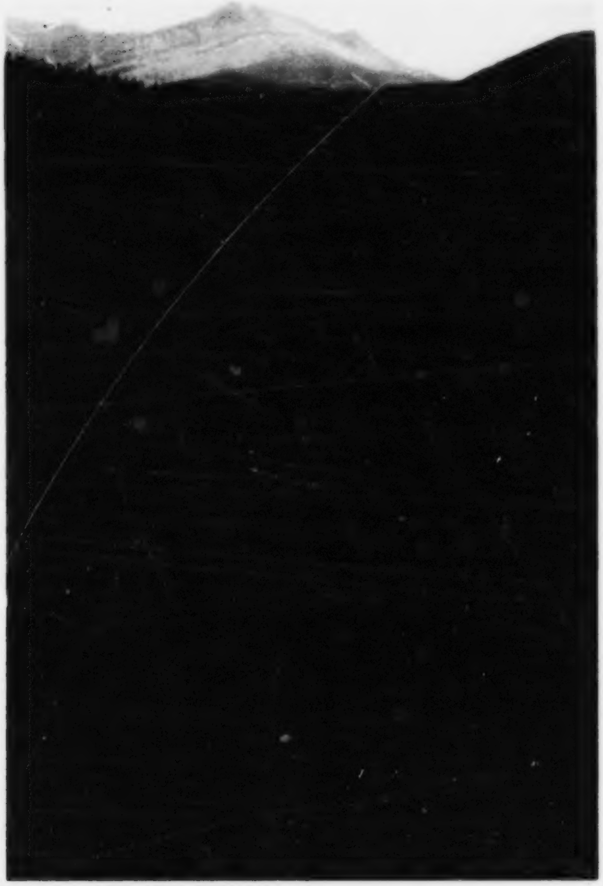


Figure 2. This figure is typical of the Tufted hairgrass-Sedge community with succession to a Willow-Bog birch dominated community type in the Central and Northern Foothills of the Subalpine subregion.

Native grass and shrubland ecology of the Foothills

The native grass and shrubland community types in the Central and Northern Foothills of the Subalpine subregion (Table 2) are found in the valley bottoms adjacent to streams and rivers. The community types in this area are very similar to the grass and shrublands found in the Upper Foothills subregion and represent a transition from the lower Upper Foothills subregion to the Central and Northern Rocky Mountains of Banff and Jasper National Parks. The sequence of these community types along a moisture gradient from wet (Sedge meadows) to dry south facing slopes (Blunt sedge-Junegrass/Bearberry, Fringed sage/Junegrass-Sedge) is outlined in Figure 2. The change in species composition from the wet sedge meadows to tufted hairgrass, California oatgrass or rough fescue meadows may occur over a 3 foot elevational gradient. The presence of bog sedge (*Kobresia myosuroides*) in the White Mtn. avens-Bog sedge and Sedge-Bog sedge-Tufted hairgrass community types appears to indicate the transition from the lower Central and Northern Foothills to the higher Central and Northern Rocky Mountains. Ogilvie (1969) and Corns and Achuff (1982), described bog sedge dominated community types in the higher elevations of the subalpine and alpine of the Rocky Mountains of Banff and Jasper National Parks.

The maintenance of these grassland community types is extremely fire dependent. The lack of fire quickly allows bog birch and willow to expand shading the modal grassland community types. Prolonged shading causes the understory composition to shift from a tufted hairgrass-California oatgrass dominated understory to a slender wheatgrass-hairy wildrye dominated understory (Figure 3). Under a heavy shrub cover there is little forb or grass cover. Increased shrub cover also causes a decline in forage productivity and reduces the accessiblility for livestock.

Many of these subalpine grass and shrublands are very fragile because of exposure and cold climate. The forage productivity is generally only half of what is found in the lower Upper Foothills subregion and recovery from overgrazing will likely take some time because of the poor growing conditions. As a result grazing by domestic livestock should be done with caution.

Table 2. Native grass and shrublands of the Central and Northern foothills ecodistricts of the Subalpine subregion

Community number	Community type	Productivity (kg/ha)				Moisture	Drainage	Carrying capacity (Ha/AUM)
		Grass	Forb	Shrub	Total			
	Ecological site phases							
a1	**shrubby grassland**	**1235**	**264**	**13**	**1512**	**Subxeric**	**Rapidly**	**40.0**
SACFA11.	Blunt sedge-Junegrass/Bearberry	1235	264	13	1512	Subxeric	Rapidly	40.0
a2	**graminoid grassland**	**807**	**393**	**178**	**1444**	**Subxeric**	**Rapidly**	**40.0**
SACFA10.	Sedge-Hairy wildrye	771	390	284	1444	Subxeric	Rapidly	40.0
SACFA12.	Fringed sage/Junegrass-Sedge	1133	545	250	2126	Subxeric	Rapidly	40.0
SACFA14.	White Mtn. avens/Bog sedge	517	245	0	762	Subxeric	Rapidly	40.0
c4	**hairy wildrye grassland**	**1487**	**689**	**167**	**2343**	**Submesic**	**Well**	**0.7**
SACFA9.	Rough fescue-Hairy wildrye-Sedge	1487	689	167	2343	Submesic	Well	0.7
d4	**california oatgrass**	**921**	**352**	**0**	**1273**	**Submesic**	**Mod. Well**	**1.2**
SACFA8.	California oatgrass-Sedge	921	352	0	1273	Submesic	Mod. Well	1.2
d5	**willow**	**598**	**418**	**300**	**1316**	**Subhygric**	**Mod.well**	**1.3**
SACFB6.	Willow-Bog birch/California oatgrass	598	418	300	1316	Subhygric	Mod. well	1.3
dd1	**sedge-bog sedge**	**582**	**158**	**0**	**740**	**Subhygric**	**Well**	**1.2**
SACFA13.	Sedge-Bog sedge-Tufted hairgrass	582	158	0	740	Subhygric	Well	1.2
dd2	**shrubland**	**1447**	**414**	**254**	**2115**	**Mesic**	**Mod.well**	**1.0**
SACFB8.	Bog birch/Bog sedge-Sedge	1333	390	202	1925	Subhygric	Mod. well	1.0
SACFB9.	Bog birch-Willow/Rough fescue	1807	705	559	3071	Mesic	Mod. well	1.0
SACFB10.	Bog birch/Rough fescue-Bog sedge	1201	147	0	1348	Mesic	Well	1.0
e1	**shrubby meadow**	**774**	**401**	**101**	**1300**	**Subhygric**	**Mod.well**	**1.2**
SACFB3.	Willow/Graceful sedge	806	109	3	919	Subhygric	Mod. well	1.3
SACFB4.	Willow-Bog birch/Tufted hairgrass	950	493	265	1803	Subhygric	Mod. well	1.3
SACFB7.	Willow-Bog birch/Hairy wildrye	868	713	135	1716	Subhygric	Well	1.0
SACFB11.	Willow/Fringed brome-Sedge	472	288	0	760	Mesic	Imperfectly	1.3

Community number	Community type	Productivity (kg/ha)				Moisture	Drainage	Carrying capacity (Ha/AUM)
		Grass	Forb	Shrub	Total			
e1a	**grazed shrubby meadow**	**1728**	**199**	**0**	**1927**	**Subhygric**	**Mod.well**	**1.4**
SACFB5.	Willow-Bog birch/Clover-Dandelion	1728	199	0	1927	Subhygric	Mod. well	1.4
e3	**grass meadow**	**1002**	**1211**	**0**	**2212**	**Subhygric**	**Mod. well**	**0.7**
SACFA4.	Tufted hairgrass-Sedge	997	288	0	1284	Subhygric	Mod. Well	0.7
SACFA17.	Fireweed-Meadow rue/Sedge-Wildrye	1006	2134	0	3140	Subhygric	Mod. well	0.7
e3a	**grazed grass meadow**	**814**	**173**	**3**	**851**	**Mesic**	**Well**	**1.4**
SACFA5.	Sedge-Tufted hairgrass	785	146	0	931	Subhygric	Mod. Well	1.4
SACFA6.	Sedge-Rocky Mtn. fescue-Alpine Timothy	661	326	7	994	Mesic	Mod. Well	1.4
SACFA7.	Sedge-Slender wheatgrass-Fringed Brome/Forb	539	156	7	702	Subhygric	Mod. Well	1.3
SACFA15.	Creeping red fescue-Sedge	1705	15	0	1720	Mesic	Well	0.6
SACFA16.	Kentucky bluegrass-Sedge/Dandelion	380	224	0	604	Mesic	Well	1.5
g2	**willow**				**N/A**	**Subhygric**	**Poorly**	**40.0**
SACFB2.	Willow/Horsetail	-	-	-	N/A	Subhygric	Poorly	40.0
h3	**grass bog**	**-**		**-**	**N/A**	**Subhydric**	**Poorly**	**1.0**
SACFA2.	Tufted bulrush	-	-	-	N/A	Subhydric	Poorly	1.0
SACFA3.	Sedge-Cottongrass	-	-	-	N/A	Subhydric	Poorly	1.0
i2	**shrubby fen**	**1234**	**129**	**1150**	**2514**	**Hygric**	**Poorly**	**40.0**
SACFB1.	Willow-Bog birch/Water sedge	1234	129	1150	2514	Hygric	Poorly	40.0
i3	**graminoid fen**	**1215**	**774**	**0**	**1721**	**Subhydric**	**Poorly**	**0.5**
SACFA1.	Water sedge-Beaked sedge	1215	774	0	1721	Subhydric	Poorly	0.5

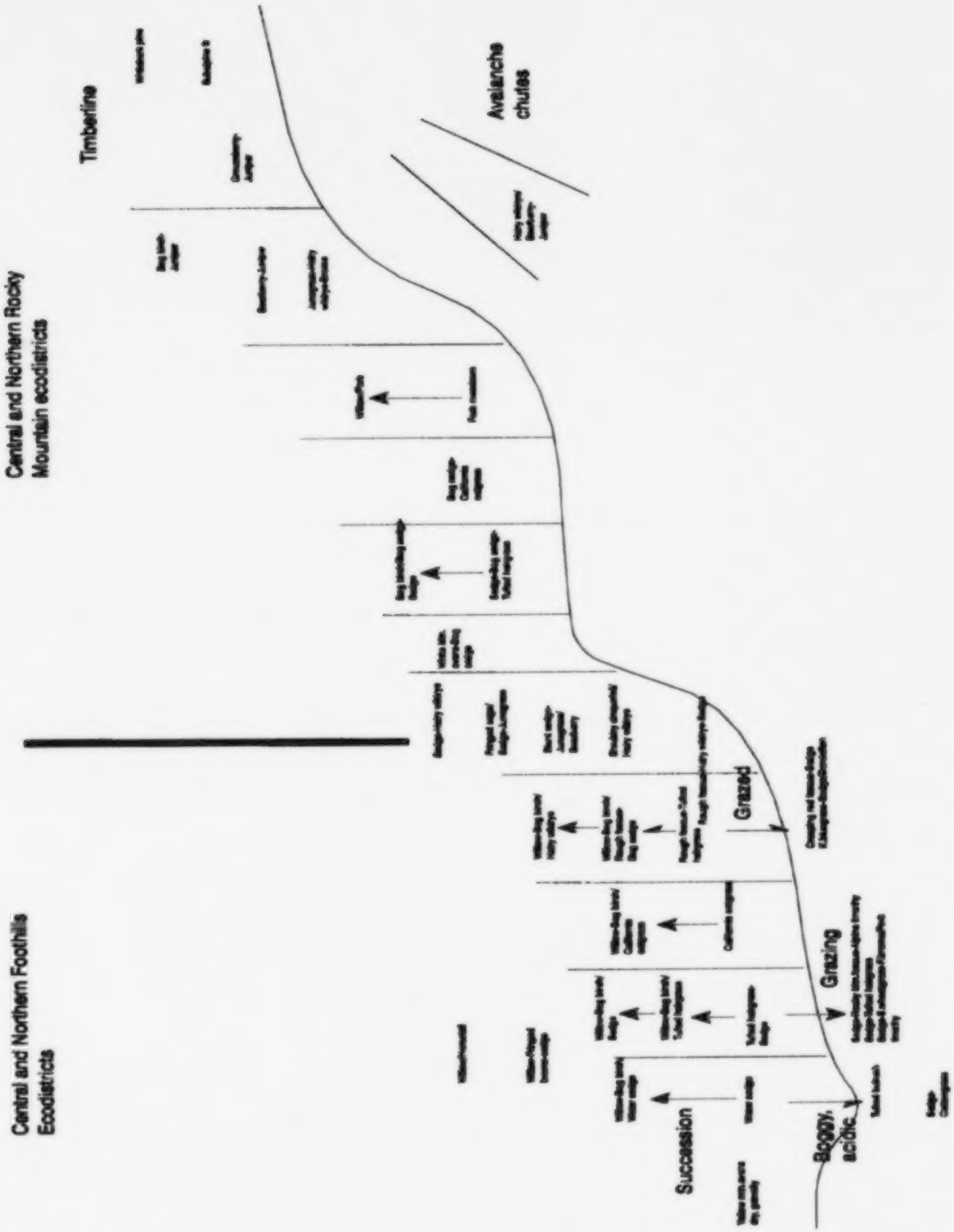

Timberline
Avalanche chutes
Central and Northern Rocky Mountain ecodistricts
Central and Northern Foothills Ecodistricts
Grazed
Grazing
Succession
Boggy, acidic

Figure 3. Grassland and shrubland community types in the landscape of the Central and Northern Rocky Mountain and Foothills areas of the Subalpine subregion

Native grass and shrublands in Central and Northern Mountain and Foothills areas

1. Community above timberline (Alpine subregion).......... **Alpine section of guide**
Community not above timberline, meadows, shrublands or south facing slopes dominated by shrubs and grass............ **2**
2. Moist sites, community dominated by shrubs >20% cover (willow, bog birch) or timberline communities with dwarf trees or grouseberry .... **see shrub key pg 34**
Drier to moist sites shrub cover <10% site dominated by grasses and forbs............ **3**
3. Community very wet free standing water, dominated by sedge, cottongrass or tufted bulrush **4**
Community drier, dominated by tufted hairgrass, rough fescue, california oatgrass, hairy wildrye, juniper or bearberry............ **6**
4. Very wet nutrient rich sites dominated by water or beaked sedge............ **SACFA1**
Very wet nutrient poor, acidic sites dominated by tufted bulrush and cottongrass............ **5**
5. Site dominated by tufted bulrush............ **SACFA2**
Site dominated by cottongrass and sedge............ **SACFA3**
6. Grasslands of meadows and lowland areas............ **7**
Grasslands of south facing slopes, or windswept ridges, hairy wildrye, bearberry, white mtn. avens dominated **20**
7. Higher elevation sites near or at timberline, moist sites dominated by wandering daisy, globeflower, mountain marigold............ **SACMA2**
Lower elevation sites, valley bottoms adjacent to streams or rivers or if higher elevation dry sites dominated by bog sedge............ **8**
8. Disturbed or grazed community types dominated by Kentucky bluegrass, creeping red fescue, dandelion, alpine bluegrass, alpine timothy or fireweed............ **9**
Undisturbed community types dominated by rough fescue, California oatgrass, bog sedge, tufted hairgrass, and sedge species............ **14**
9. Moderately grazed site native increasers dominant (slender wheatgrass, sedge, fringed brome, rocky mtn. fescue, alpine timothy), Alpine or Kentucky bluegrass increasing in cover............ **10**
Heavily grazed sites dominated by Kentucky bluegrass or abandoned airstrips dominated by creeping red fescue or native forb species (fireweed, veiny meadow rue)............ **12**
10. Site dominated by Alpine bluegrass............ **SACMA8**
Site dominated by rocky mtn. fescue, alpine timothy, sedge, slender wheatgrass, fringed brome (moister sites)............ **11**
11. Site dominated by rocky mtn. fescue, alpine timothy, sedge............ **SACFA6**
Site dominated by slender wheatgrass, sedge, fringed brome............ **SACFA7**
12. Heavily grazed site dominated by Kentucky bluegrass and dandelion........ **SACFA16**
Abandoned airstrips dominated by creeping red fescue, or invaded strips dominated by forbs (fireweed, veiny meadow)............ **13**
13 Site dominated by creeping red fescue............ **SACFA15**
Moister disturbed site dominated by fireweed and veiny meadow rue... **SACFA17**
14. Moist sites dominated by sedge and tufted hairgrass............ **15**
Drier sites dominated by rough fescue, hairy wildrye, bog sedge, yellow dryas or California oatgrass............ **16**
15. Site dominated by tufted hairgrass, sedge co-dominant............ **SACFA4**
Site dominated by sedge, tufted hairgrass co-dominant............ **SACFA5**

16. Sites dominated by rough fescue and hairy wildrye............ **SACFA9**
Sites dominated by California oatgrass, bog sedge, or yellow dryas............ **17**
17. Gravelly river flats dominated by yellow dryas............ **SACMA9**
Meadow areas dominated by California oatgrass and/or bog sedge............ **18**
18. Site dominated by bog sedge and california oatgrass............ **19**
Site dominated by california oatgrass and sedge, bog sedge not present......... **SACFA8**
19. Site dominated by bog sedge, california oatgrass, drier sites............ **SACMA1**
Site co-dominated by bog sedge, tufted hairgrass, and sedge moister sites... **SACFA13**
20. Lower elevation grasslands in the Foothills of the Subalpine............ **21**
Higher elevation grasslands in the mountains of the Subalpine............ **22**
21 Northern wheatgrass dominated site............ **SACMA7**

Fringed sage, sedge and junegrass dominated slope............................SACFA12

22. Avalanche slopes dominated by hairy wildrye, juniper, and bearberry....SACMA6

Drier sites or windswept ridges dominated hairy wildrye, juniper, bearberry, shrubby cinquefoil, white mtn. avens.. 23

23. Windswept ridges dominated by white mtn. avens................................SACFA14

South facing slopes dominated by hairy wildrye.. 24

24. Shallow rocky soils with little grass cover, site dominated by bearberry.. SACMA4

Deeper soils, good grass cover dominated by hairy wildrye, junegrass.................................. 25

25. Shrubby cinquefoil dominant in stand...SACMA3

Grass cover extensive, dominated by hairy wildrye, junegrass, and brome....SACMA5

Shrub dominated communities

1. Timberline communities dominated by whitebark pine, subalpine fir, grouseberry, or willow communities with marsh marigold, wandering daisy or globeflower in understory.. 2

Riparian communities adjacent to streams or rivers.. 5

2. Trees present in community (whitebark pine, subalpine fir) or grouseberry dominated.... 3

Moist seepage areas at treeline dominated by globeflower, wandering daisy or marsh marigold in understory..SACMB6

3. Trees (subalpine fir, whitebark pine) on site.. 4

Grouseberry dominated shrubland..SACMB7

4. Whitebark pine present..SACMB3

Subalpine fir present..SACMB8

5. Very wet sites with water sedge or horsetail dominated understories.............................. 6

Drier sites with tufted hairgrass, california oatgrass, bog sedge, hairy wildrye, rough fescue Kentucky bluegrass, dandelion dominated understories.. 7

6. Water sedge dominated understory..SACFB1, SACMB1

Horsetail dominated understory..SACFB2

7. Grazed communities dominated by clover and dandelion in understory................ SACFB5

Ungrazed sites dominated by native forbs and grasses in understory.................................. 8

8. Shrubland communities on seepage areas on south facing slopes with shallow soils, dominated by bog birch and juniper.. ....SACMB5

Meadows and lowland shrublands dominated by rough fescue, bog sedge, california oatgrass, tufted hairgrass, hairy wildrye or sedge in the understory.. 9

9. Rough fescue dominates the understory.. 10

Tufted hairgrass, california oatgrass, bog sedge, sedge, hairy wildrye dominate................ 11

10. Rough fescue and bog sedge dominate understory higher elevations................SACFB10

Rough fescue dominates, bog sedge not present lower elevations......................SACFB9

11. Moister sites with deep fluvial deposits dominated by tufted hairgrass, sedge, or fringed brome in understory.. 12

Drier sites which are well drained at the surface dominated by hairy wildrye, sedge, bog sedge or california oatgrass in understory.. 14

12. Tufted hairgrass or sedge dominated understory.. 13

Fluvial areas with Fringed brome dominated understory, lower elevation.........SACFB11

13. Tufted hairgrass dominates understory..SACFB4

Graceful sedge and other sedge species dominate understory..............................SACFB3, SASMB2

14. Modal sites with hairy wildrye and sedge dominating understory.. 15

Sites dominated by california oatgrass or bog sedge in understory...................................... 16

15. Hairy wildrye dominates understory..SACFB7,SACMB3

Graceful sedge and other sedge species dominate understory.........................SACFB3, SASMB2

16. California oatgrass dominates understory..SACFB6

Bog sedge dominates understory..SACFB8, SACMB4

SACFA1. Water sedge-Beaked sedge meadows

(Carex aquatilis-Carex rostrata)

n=11 This community type is found in all ecodistricts of the subalpine. Wet conditions and periodic flooding result in the formation of water sedge-beaked sedge meadows. Bog birch and willow will invade into the drier edges of these meadows to form the Willow-bog birch/Water sedge community type.

These community types are quite productive producing nearly 2000 kg/ha of forage, but the high water table in the spring and summer when these meadows are most palatable limits livestock use. A study in the Yukon found that crude protein on these meadows declined from a high of 10% in May to less than 5% in September (Bailey et al. 1992). As a result, these meadows would be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SMOOTH WILLOW *(Salix glauca)*	1	0-7	27
BOG BIRCH *(Betula glandulosa)*	3	0-20	46
FORBS			
ARROW LEAVED COLTSFOOT *(Petasites sagitatus)*	7	0-14	18
GRASSES			
WATER SEDGE *(Carex aquatilis)*	23	0-62	64
BEAKED SEDGE *(Carex rostrata)*	11	0-42	55
ROCKY-GROUND SEDGE *(Carex saxatilis)*	9	0-70	18
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	2	0-5	64

MOISTURE REGIME:
HYGRIC

NUTRIENT REGIME
PERMESOTROPHIC

ELEVATION:
1750M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION IN KG/HA

GRASS	1215
FORBS	774
TOTAL	1721 * ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
1.0 (40.0-1.0)HA/AUM
0.4(.01-0.4) AUM/AC

ENVIRONMENTAL VARIABLES

SACFA2. Tufted bulrush

(Scirpus cespitosus)

n=12 This community type occurs on subhydric to hydric, lower subalpine sites (1490-1870 m) on nearly level slopes. Corns and Achuff (1982), described this community type on poorly drained soils in the valleys of Banff and Jasper National Park. The soils are dominated by Terric Mesisols and Orthic Gleysols. They felt this community type was successionally mature.

This community type and the Water sedge-Beaked sedge both occupy poorly drained sites with free standing water, but the dominance of tufted bulrush appears to indicate acidic boggy and peaty sites (Scoggan 1978).

PLANT COMPOSITION	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	6	0-35	75
BOG BIRCH			
(Betula glandulosa)	3	0-10	50
FORBS			
ELEPHANT'S HEAD			
(Pedicularis groenlandicum)	1	0-5	58
WOOLY EVERLASTING			
(Antennaria lanata)	1	0-5	42
GRASSES			
TUFTED BULRUSH			
(Scirpus cespitosus)	61	18-85	100
WATER SEDGE			
(Carex aquatilis)	2	0-10	42
RUSH-LIKE SEDGE			
(Carex scirpoidea)	1	0-10	17

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
HYGRIC-SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1678(1490-1870) M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

NOT AVAILABLE

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
1 (40.0-1.0)HA/AUM
0.4(.01-0.4) AUM/AC

SACFA3. Sedge-Cottongrass

(Carex spp.-Eriophorum spp.)

n=7 Corns and Achuff (1982), described a cottongrass dominated community on hydric sites in the Upper subalpine on level to gentle slopes. They found the cottongrass communities to form on depressional areas where the snow melts late and seepage is recieved throughout the growing season. Cottongrass is also characteristic of muskegs and boggy marshes. It appears that this community is located on better drained areas adjacent to tufted bulrush dominated community type. The high acidity of the soil appears to favour the growth of cottongrass, rush-like sedge and rocky ground sedge over water sedge.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP.			
(Salix spp.)	4	1-11	100
BOG BIRCH			
(*Betula glandulosa*)	1	0-5	43
FORBS			
LANCED -LEAVED PAINT BRUSH			
(Castilleja occidentalis)	2	0-10	57
WOOLLY EVERLASTING			
(Antennaria lanata)	1	0-4	57
COMMON HORSETAIL			
(Equisetum arvense)	3	0-22	14
GRASSES			
RUSH-LIKE SEDGE			
(Carex scirpoidea)	8	0-25	57
ROCKY-GROUND SEDGE			
(Carex saxatilis)	12	0-80	29
SHORT SEDGE			
(*Carex curta*)	7	0-50	14
SHEATHED COTTONGRASS			
(Eriophorum vaginatum)	1	0-10	14
TALL COTTONGRASS			
(*Eriophorum polystachion*)	5	0-18	57

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
HYDRIC-SUBHYGRIC

NUTRIENT REGIME:
EUTROPHIC

ELEVATION:
1778 (1260-2000)M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODCUTION KG/HA

NOT AVAILABLE

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
1 (40.0-1.0)HA/AUM
0.4(.01-0.4) AUM/AC

SACFA4. Tufted hairgrass-Sedge

(Deschampsia cespitosa-Carex spp.)

n=18 This community type is located on moist sites that are better drained and slightly drier than the pure sedge meadows. Willoughby(2005), found that tufted hairgrass is a common plant species on lowland sites in the valley bottoms of the Upper Foothills subregion . Willoughby (1992), found when this community type is protected from grazing for 25-30 years, willow and bog birch expand and tufted hairgrass and sedge decline. The decline in graminoid cover also results in a decline in available forage production . Continuous heavy grazing causes hairgrass to decline and the site will be invaded by Kentucky bluegrass and dandelion.

Bork (1994), found this community type to be the most productive type described in Willmore Wilderness park. Forage production averages over 2000 kg/ha and can vary from (800-3300 kg/ha). It is interesting to note that forage production on this community type declines from an average of 2200 kg/ha in the Upper Foothills to 1555 kg/ha in the Subalpine subregion. The shorter growing season and colder climate may account for this change in forage productivity. These community types when located next to backcountry campsites will be utilized by horses.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Barclay's willow *(Salix barclayi)*	2	0-7	22
Forbs			
Slender Blue Beardstongue *(Penstemon procerus)*	2	0-9	72
Veiny Meadow Rue *(Thalictrum venulosum)*	5	0-14	50
Yarrow *(Achillea millefolium)*	4	0-14	94
Smooth leaved Cinquefoil *(Potentilla diversifolia)*	12	0-43	72
Old man's whiskers *(Geum triflorum)*	1	0-6	22
Alpine Goldenrod *(Solidago multiradiata)*	1	0-13	72
Grasses			
Graceful Sedge *(Carex praegracilis)*	38	0-85	94
Tufted Hairgrass *(Deschampsia cespitosa)*	31	12-57	100
Slender wheatgrass *(Agropyron trachycaulum)*	2	0-12	33
Sheep Fescue *(Festuca saximontana)*	3	0-16	33
Hairy wildrye *(Elymus innovatus)*	3	0-20	50

Environmental Variables

Moisture Regime:
Mesic to hygric
Nutrient Regime:
Mesotrophic to permesotrophic
Elevation:
1896(1630-2130) m
Soil Drainage:
Mod. well to Very poorly
Slope:
3(1-5)%
Aspect:
Variable
Ecological status score: 24

Forage Production Kg/Ha

Grass	997 (532-1923)
Forbs	288(0-928)
Total	1284 (532-2118)

Ecologically sustainable stocking rates
1(1.7-0.6) HA/AUM
0.4 (.24-.68)AUM/AC

SACFA5. Sedge-Tufted hairgrass

(Carex spp.-Deschampsia cespitosa)

n=8 This community type was described in the Job Lake, Blackstone-Wapiabi Forest Land Use Zones. These areas are extensively utilized by equestrian backcountry users. This community type appears to develop from moderate to heavy grazing pressure on a Tufted hairgrass-Sedge community. Continued heavy grazing pressure appears to cause a further decline in tufted hairgrass to form the Sedge-Rocky Mtn. fescue-Alpine timothy and Sedge-Slender wheatgrass-Fringed brome/Forb community types. If the seed source becomes available these sites have the potential to be invaded by Kentucky bluegrass, timothy, clover and dandelion if the grazing pressure continues.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Bog birch			
(Betula glandulosa)	1	0-2	13
Forbs			
Alpine Bistort			
(Polygonum viviparum)	1	0-4	75
Veiny meadow rue			
(Thalictrum venulosum)	4	0-16	50
Yarrow			
(Achillea millefolium)	3	0-6	88
Smooth leaved cinquefoil			
(Potentilla diversifolia)	9	0-18	75
Purple avens			
(Geum rivale)	7	0-42	63
Green sorrel			
(Rumex acetosa)	2	0-8	75
Grasses			
Graceful sedge			
(Carex praegracilis)	58	19-98	100
Tufted Hairgrass			
(Deschampsia cespitosa)	18	3-34	100
Kentucky bluegrass			
(Poa pratensis)	4	0-15	75
Alpine Fescue			
(Festuca brachyphylla)	3	0-15	63
California oatgrass			
(Danthonia californica)	3	0-9	50

Environmental Variables

Moisture Regime:
Mesic -Subhygric

Nutrient Regime:
Mesotrophic to Permesotrophic

Elevation:
1866(1832-1895) m

Soil Drainage:
Well to Mod. well

Ecological status score: 16

Forage Production Kg/Ha

Grass	785(341-1369)
Forbs	146(0-443)
Total	931(412-1738)

Ecologically sustainable stocking rates
1.4 (2.2-1.0) HA/AUM
0.3(0.2-0.4) AUM/AC

SACFA6. Sedge-Rocky Mountain fescue-Alpine timothy

(Carex praegracilis-Festuca saximontana-Phleum commutatum)

n=6 This community type appears to arise from grazing of a modal Tufted hairgrass-Sedge community type. The six sites described in this community were all located next to outfitter campsites and had been heavily grazed by horses. The heavy grazing pressure causes tufted hairgrass to decline and allows non-native plants such as Kentucky bluegrass and dandelion to invade onto the site. The heavy grazing pressure also appears to change the moisture regime of the site. Many of the plant species on the site, Rocky mountain fescue, Alpine timothy, Alpine bluegrass, junegrass and hairy wildrye are better adapted to well drained, drier conditions. Perhaps, the removal of litter causes the water to drain away from the site more rapidly. Bork (1994), noticed this on similar sites in Willmore Wilderness park. This community type maybe grazed heavier than the previously described Sedge-Tufted hairgrass community type or it could be drier and the grazing pressure shifts the community to one dominated by more drought resistant species.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUB			
BOG BIRCH (*Betula glandulosa*)	3	0-12	33
FORBS			
SLENDER BLUE BEARDTONGUE *(Penstemon procerus)*	2	0-3	83
YARROW *(Achillea millefolium)*	6	1-9	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	4	0-13	83
CHICKWEED *(Cerastium arvense)*	1	0-3	83
DANDELION *(Taraxacum offincinale)*	2	0-7	83
NORTHERN VALERIAN (*Valeriana dioica*)	2	0-5	50
GRASSES			
ROCKY MOUNTAIN FESCUE *(Festuca saximontana)*	15	0-30	83
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	4	0-20	50
KENTUCKY BLUEGRASS *(Poa pratensis)*	5	0-14	67
GRACEFUL SEDGE *(Carex praegracilis)*	9	0-42	50
ALPINE TIMOTHY *(Phleum commutatum)*	6	0-15	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC-SUBHYGRIC

NUTRIENT REGIME:
SUBMESOTROPHIC TO MESOTROPHIC

ELEVATION:
1886(1634-2130) M

SOIL DRAINAGE:
WELL TO IMPERFECTLY

SLOPE: 6(2-10)%

ASPECT: VARIABLE

ECOLOGICAL STATUS SCORE: 8

FORAGE PRODUCTION KG/HA

GRASS	661 (294-1121)
FORB	326 (0-524)
SHRUB	7 (0-14)
TOTAL	994 (729-1341)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
1.4 (2.2-1.0) HA/AUM
0.3(0.2-0.4) AUM/AC

SACFA7. Sedge-Slender wheatgrass-Fringed brome/Forbs

(Carex praegracilis-Agropyron trachycaulum-Bromus ciliatus/Forbs)

n=18 This community type appears to arise from grazing of a modal Tufted hairgrass-Sedge community type. All the sites described in this community were found adjacent to outfitter campsites in the Job Lake, Blackstone-Wapiabi forest land use zones. The heavy grazing pressure causes tufted hairgrass to decline and allows sedges, slender whatgrass and fringed brome to increase. This community type maybe slightly moister than the previously described Sedge-Rocky mountain fescue-Alpine timothy community. As a result there is succession to more mesic loving plants rather than the drought tolerant plants described in the previous community type.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Willow spp. (*Salix spp.*)	1	0-10	33
Forbs			
Alpine Bistort (*Polygonum viviparum*)	7	0-59	67
Yarrow (*Achillea millefolium*)	4	0-21	83
Smooth leaved cinquefoil (*Potentilla diversifolia*)	11	0-37	72
Alpine goldenrod (*Solidago multiradiata*)	4	0-28	72
Strawberry (*Fragaria virginiana*)	6	0-29	61
False-dandelion (*Agoseris glauca*)	3	0-22	72
Grasses			
Slender wheatgrass (*Agropyron trachycaulum*)	4	0-15	50
Tufted hairgrass (*Deschampsia cespitosa*)	4	0-20	33
Kentucky bluegrass (*Poa pratensis*)	6	0-26	78
Graceful sedge (*Carex praegracilis*)	50	2-94	100
Fringed brome (*Bromus ciliatus*)	14	0-50	78
Hairy wildrye (*Elymus innovatus*)	8	0-46	44

Environmental Variables

Moisture Regime:
Mesic-hygric

Nutrient Regime:
Mesotrophic-Permesotrophic

Elevation:
1926(1830-2076) m

Soil Drainage:
well to moderately well
Ecological status score: 16 or 8

Forage Production Kg/Ha

Grass	539(162-944)
Forb	156(0-370)
Shrub	7(0-44)
Total	702(354-1094)

Ecologically sustainable stocking rates
1.3 (2.6-0.8) ha/AUM or
0.31 (0.16-0.51) AUM/ac

SACFA8. California oatgrass-Sedge

(Danthonia californica-Carex spp.)

n=5 This community is very similar to a community type described by Willoughby(2005) in the Upper Foothills subregion. Corns and Achuff (1982), described a Willow/California oatgrass dominated community type in Banff and Jasper National Park. It appears dry, gravelly or stony soils, with a fluctuating water table support this moderately productive grassland. Small pockets of this community type occur throughout the Subalpine subregion. In the Yukon these small meadows were found to form in depressions which appeared to act as pronounced frost pockets (Bailey et al. 1992). The cold air drainage and poor nutrient quality of the soil limits the forage productivity of these sites.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. *(Salix spp.)*	3.8	0-13	60
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	0-10	60
FORBS			
TALL LARKSPUR *(Delphinium glaucum)*	4	0-11	80
WILD STRAWBERRY *(Fragaria virginiana)*	6	0-25	60
SMOOTH LEAVED CINQUEFOIL *(Potentilla diversifolia)*	11	0-31	80
YARROW *(Achillea millefolium)*	4	0-20	80
VEINY MEADOW RUE *(Thalictrum venulosum)*	10	0-25	60
SLENDER BLUE BEARDTONGUE *(Penstemon procerus)*	9	0-30	60
GRASSES			
CALIFORNIA OATGRASS *(Danthonia californica)*	37	15-60	100
GRACEFUL SEDGE *(Carex praegracilis)*	24	0-63	40
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	3	0-15	20
HAIRY WILDRYE *(Elymus innovatus)*	11	0-29	60
SPIKED TRISETUM *(Trisetum spicatum)*	1	0-5	60
BOG SEDGE *(Kobresia myosuroides)*	4	0-19	20

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1830(1380-2100)M

SOIL DRAINAGE:
MODERATELY WELL TO WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	921
FORBS	352
TOTAL	1273 * ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATES
1.2(1.3-0.7) HA/AUM OR
0.3(0.3-0.6)AUM/AC

SACFA9. Rough fescue-Hairy wildrye-Sedge

(Festuca scabrella-Elymus innovatus-Carex spp.)

n=13 This community was described in the Panther Corners Forest Land Use Zone and in Willmore Wilderness Park on level to undulating ridges, terraces and lower slope positions with Orthic Eutric Brunisolic soils. It is very similar to the Rough fescue-Hairy wildrye community described by Willoughby(2005) in the Upper Foothills subregion and the Rough fescue-Wheatgrass-Hairy wildrye community described by Morgantini and Russell (1983) on Ribbon flats just north of the Panther Corners. This community type is moderately productive and one of the most important communities for wintering elk (Morgantini and Russell 1983). An examination of winter elk diets found that rough fescue made up 45 to 60% of their food intake during the months of December, January and March (Morgantini and Russell 1983). Care must be taken that this community type is not over-utilized by horses and that sufficient forage is left for overwintering elk.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	8	0-31	92
FORBS			
TALL LARKSPUR			
(Delphinium glaucum)	1	0-7	62
WILD STRAWBERRY			
(Fragaria virginiana)	2	0-7	77
GRACEFUL CINQUEFOIL			
(Potentilla gracilis)	4	0-11	62
YARROW			
(Achillea millefolium)	3	0-7	92
OLD MAN'S WHISKERS			
(Geum triflorum)	5	0-12	62
AMERICAN VETCH			
(Vicia americana)	3	0-7	77
GRASSES			
ROUGH FESCUE			
(Festuca scabrella)	18	10-34	100
SEDGE			
(Carex spp.)	8	1-14	100
SLENDER WHEATGRASS			
(Agropyron trachycaulum)	3	0-13	69
HAIRY WILDRYE			
(Elymus innovatus)	6	1-18	100
JUNEGRASS			
(Koeleria macrantha)	1	0-4	85

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC TO MESIC

NUTRIENT REGIME:
MESOTROPHIC -PERMESOTROPHIC

ELEVATION:
1786(1600-2150)M

SOIL DRAINAGE:
WELL TO RAPIDLY
SLOPE:
32(10-60)%
ASPECT:
SOUTHERLY
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1487(454-3056)
FORBS	689(302-1792)
SHRUB	167(0-968)
TOTAL	2343(1284-4060)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
0.7 (0.9-0.4) HA/AUM OR
0.6(0.0.5-1.0) AUM/AC

SACFA10. Sedge-Hairy wildrye

(Carex spp.-Elymus innovatus)

n=13 This community was described in the Panther Corners Forest Land Use Zone on steep west and south facing slopes at higher elevations. It occupies sites that are similar to the Fringed sage/Sedge-Junegrass community, but this community type is found at elevations averaging over 2000 meters. This community type is similar to the hairy wildrye dominated communities described by Corns and Achuff (1982) at higher elevations in the subalpine of the Central Mountains ecodistrict (SACMA,4,5,6). This community type was only lightly utilized by elk. In contrast the lower elevation Fringed sage/Sedge-Junegrass exhibited signs of heavy elk use. The higher elevation of this community may limit access to wildlife in this area. It is possible that if this community type was heavily grazed it may resemble the Fringed sage/Sedge-Junegrass community described at lower elevations.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	4	0-14	77
FORBS			
TALL LARKSPUR *(Delphinium glaucum)*	1	0-5	54
WILD STRAWBERRY *(Fragaria virginiana)*	2	0-16	39
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	2	0-5	100
YARROW *(Achillea millefolium)*	1	0-4	77
OLD MAN'S WHISKERS *(Geum triflorum)*	2	0-18	23
AMERICAN VETCH *(Vicia americana)*	1	0-3	39
BEARBERRY *(Arctostaphylos uva-ursi)*	4	0-61	8
GRASSES			
ROUGH FESCUE *(Festuca scabrella)*	2	0-9	31
SEDGE *(Carex spp.)*	20	3-48	84
POA *(Poa spp.)*	2	0-5	54
HAIRY WILDRYE *(Elymus innovatus)*	8	1-29	100
JUNEGRASS *(Koeleria macrantha)*	1	0-3	46
SMOOTH BROME *(Bromus inermis)*	3	0-6	85

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC TO MESIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
2029(1650-2300)M
SOIL DRAINAGE:
WELL TO RAPIDLY
ASPECT:
SOUTHERLY AND WESTERLY
SLOPE:
36(0-50)%
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	771 (460-1168)
FORBS	390 (160-1010)
SHRUB	284 (0-1712)
TOTAL	1444 (676-3150)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
40(40-1.0) HA/AUM
.01(0.01-0.4) AUM/AC

SACFA11. Blunt sedge-Junegrass/Bearberry

(Carex obtusata-Koeleria macrantha/Arctostaphylos uva-ursi)

n=3 This community type occurs on steep south facing slopes, with shallow soils, overlying sandstone bedrock. The majority of the vegetation are composed of drought tolerant species bearberry and junegrass. The inaccessibility and fragile nature of the soils make this community type unsuitable for grazing. This community is very similar to the Junegrass/Sage community described by Willoughby(2005) in the Upper Foothills subregion and the Low northern Sedge/Bearberry community described by Lawrence et al. (2005) in the Lower Foothills subregion on the south facing slopes of the Athabasca River valley.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	3	2-3	100
FORBS			
BEARBERRY			
(Arctostaphylos uva-ursi)	11	0-16	67
SHOWY LOCOWEED			
(Oxytropis splendens)	10	9-10	100
SWEET FLOWERED ANDROSACE			
(Androsace chamaejasme)	7	0-19	67
ALPINE GOLDENROD			
(Solidago multiradiata)	1	0-2	67
COMMON YARROW			
(Achillea millefolium)	7	2-13	100
GRASSES			
JUNEGRASS			
(Koeleria macrantha)	10	1-23	100
SHEEP FESCUE			
(Festuca saximontana)	7	0-12	67
BLUNT SEDGE			
(*Carex obtusata*)	3	1-7	100
HAIRY WILDRYE			
(*Elymus innovatus*)	3	0-6	67
SLENDER WHEATGRASS			
(*Agropyron trachycaulum*)	3	1-5	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC TO SUBXERIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1990(1950-2070)M

SOIL DRAINAGE: RAPIDLY

SLOPE: 40(30-60)%

ASPECT: SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1235(1196-1274)
FORB	264(148-380)
SHRUB	13(0-26)
TOTAL	1512(1370-1654)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
40(40-1.0) HA/AUM
.01(0.01-0.4) AUM/AC

SACFA12. Fringed sage/White scaled sedge-Junegrass

(Artemisia frigida/Carex xerantica-Koeleria macrantha)

n=5 This community type occurs on steep south facing slopes, with shallow soils. It is very similar to the previously described Sedge-Junegrass/Bearberry community type, but lacks the cover of bearberry. The lack of bearberry cover in this community type may indicate that the soils of this type are better developed and slightly moister. The inaccessibility and fragile nature of the soils make this community type unsuitable for domestic livestock grazing. This community type is important winter habitat for migrating elk. The steepness of the slope and the southerly aspect limit snow accumulation and allows access to the forage supply. This community is very similar to the Junegrass/Sage community described by Willoughby(2005) in the Upper Foothills subregion.

PLANT COMPOSITION	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	2	0-4	80
PRICKLY ROSE (*Rosa acicularis*)	3	0-8	100
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	1	0-2	20
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	3	1-4	100
FRINGED SAGE *(Artemisia frigida)*	6	1-15	100
AMERICAN VETCH *(Vicia americana)*	3	0-9	60
NORTHERN BEDSTRAW *(Galium boreale)*	5	1-14	100
GRASSES			
JUNEGRASS *(Koeleria macrantha)*	5	3-7	100
WESTERN WHEATGRASS *(Agropyron smithii)*	4	0-9	80
WHITE SCALED SEDGE (*Carex xerantica*)	10	6-12	100
ROUGH FESCUE (*Festuca scabrella*)	3	0-6	80
SLENDER WHEATGRASS (*Agropyron trachycaulum*)	3	0-7	60

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC TO SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

SLOPE: 53(45-60)%

ASPECT: SOUTHERLY

ELEVATION:
1790(1650-1900)M

SOIL DRAINAGE: RAPIDLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

Grass	1133(650-2206)
FORB	545(202-890)
SHRUB	250(0-556)
TOTAL	1928(936-3096)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
40(40-1.0) HA/AUM
.01(0.01-0.4) AUM/AC

SACFA13. Sedge-Bog sedge-Tufted hairgrass

(Carex praegracilis-Kobresia myosuroides-Deschampsia cespitosa)

n=6 This community type is found on moist lowland sites at higher elevations in the Central and Northern Foothills. The presence of bog sedge appears to indicate the transition to the higher Alpine subregion . Indeed, Ogilvie (1969) described bog sedge dominated community types at higher elevations in the Alpine subregion.

The presence of bog sedge may also represent the transition between the foothills ecodistricts to the rocky mountain ecodistricts. Corns and Achuff (1982), described bog sedge dominated community types in the Subalpine subregion of Banff and Jasper National Parks.

The forage production on this community type is only moderate. Perhaps, the higher elevation and colder climate which favours the growth of bog sedge limits the total productivity of the site. Camping and grazing of these communities by horses should be restricted.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL. *(Potentilla fruticosa)*	1	0-4	67
FORBS			
ALPINE GOLDENROD *(Solidago multiradiata)*	7	1-15	100
STRAWBERRY *(Fragaria virginiana)*	1	0-4	50
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	3	0-10	33
YARROW *(Achillea millefolium)*	5	1-15	100
ALPINE BISTORT *(Polygonum viviparum)*	6	1-13	100
SMOOTH LEAVED CINQUEFOIL (*Potentilla diversifolia*)	12	0-31	83
GRASSES			
GRACEFUL SEDGE *(Carex praegracilis)*	40	14-60	100
BOG SEDGE *(Kobresia myosuroides)*	20	10-28	100
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	13	5-37	83
ROCKY MOUNTAIN FESCUE (*Festuca saximontana*)	3	0-10	33
ALPINE BLUEGRASS (*Poa alpina*)	2	0-13	50
HAIRY WILDRYE (*Elymus innovatus*)	7	1-30	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBHYGRIC
NUTRIENT REGIME:
MESOTROPHIC
ELEVATION:
1900(1832-2438)M
SOIL DRAINAGE:
IMPERFECTLY
SLOPE:
1%
ASPECT:
NORTHEAST
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	582 (310-1002)
FORB	158 (58-272)
TOTAL	740 (582-1060)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
1.2 (1.6-0.9) HA/AUM
0.34 (0.25-0.45) AUM/AC

SACFA14. White mountain avens/Bog sedge

(Dryas integrifolia/Kobresia myosuroides)

n=3 This community type occupies shallow, stoney, wind exposed sites. It represents the transitional community between the bog sedge and white mountain avens community types described by Ogilvie (1969) and Corns and Achuff (1982) on windswept ridges in the Alpine and Subalpine subregions of the Rocky Mountains. The microsite conditions are very similar to higher elevation sites in the Rocky Mountains allowing this community to form in the lower Central Foothills.

The poor soil conditions limits the forage productivity and amount of regrowth after grazing. Often this community type is important winter range for bighorn sheep, because this community type remains snow free for much of the winter.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
FORBS			
WHITE MOUNTAIN AVENS *(Dryas integrifolia)*	46	1-41	67
ALPINE BISTORT *(Polygonum viviparum)*	6	3-9	100
ALPINE HEDYSARUM *(Hedysarum alpinum)*	2	0-4	100
ALPINE MILKVETCH *(Astragalus alpinus)*	1	0-3	33
GRASSES			
BOG SEDGE *(Kobresia myosuroides)*	11	1-32	100
GRACEFUL SEDGE *(Carex praegracilis)*	6	0-17	33
HAIRY WILDRYE (Elymus *innovatus*)	5	0-9	67
LICHENS			
REINDEER LICHEN (*Cladina spp.*)	17	0-40	67

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
1912(1878-1981)M

SOIL DRAINAGE: RAPIDLY

SLOPE: 30%

ASPECT: SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	517(89-945)
FORB	245(200-290)
TOTAL	762(289-1235)

ECOLOGICALLY SUSTAINABLE STOCKING RATES
GENERALLY NON-USE
40 (40.0-1.0) HA/AUM
.01(.01-0.4) AUM/AC

SACFA15. Creeping red fescue-Sedge

(Festuca rubra-Carex spp.)

n=1 This community type was described in the Blackstone-Wapiabi forest land use zone. It represents an old wellsite road that has been seeded to creeping red fescue. The creeping red fescue was probably used as the reclamation seed to stabilize the road from erosion. Presently, it is the recommendation of the forest service to use native seed in reclamation of these areas in the backcountry. Many of these agronomic mixes are highly invasive on the surrounding vegetation and there is the potential to introduce noxious weeds.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
WILLOW (*Salix barclayi*)	1	-	100
FORBS			
PALMATE LEAVED COLTSFOOT (*Petasites palmatus*)	1	-	100
FIREWEED (*Epilobium angustifolium*)	1	-	100
GRASSES			
CREEPING RED FESCUE (*Festuca rubra*)	63	-	100
GRACEFUL SEDGE (*Carex praegracilis*)	38	-	100
TUFTED HAIRGRASS (*Deschampsia cespitosa*)	2	-	100
TIMOTHY (*Phleum pratense*)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1832M

SOIL DRAINAGE:
WELL

SLOPE:
LEVEL

ECOLOGICAL STATUS SCORE: MODIFIED OR TAME PASTURE

FORAGE PRODUCTION KG/HA

GRASS	1705
FORB	15
TOTAL	1720

ECOLOGICALLY SUSTAINABLE STOCKING RATES
0.7(1.0-0.5) HA/AUM OR
0.7(0.4-0.8) AUM/AC

SACFA16. Kentucky bluegrass-Sedge/Dandelion

(Poa pratensis-Carex spp./Taraxacum officinale)

n=1 This community type was described in the Job Lake forest land use zone. It represents a Tufted hairgrass-Sedge meadow that has been heavily grazed for a prolonged period of time. As a result there has been a decline in tufted hairgrass and other native plant species and an invasion of Kentucky bluegrass and dandelion. This community type is uncommon in the backcountry areas because of the lack of seed source for Kentucky bluegrass and dandelion. However, once established it is very competitive and will likely remain on the site. Kentucky bluegrass is very productive, but it quickly loses it nutrient quality in the dormant season. This loss of nutrient quality will impact wildlife utilizing the area.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW (*Salix barclayi*)	1	-	100
FORBS			
ALPINE BISTORT *(Polygonum viviparum)*	18	-	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	8	-	100
SWEET FLOWERED ANDROSACE (*Androsace chamaejasme*)	3	-	100
ALPINE MILKVETCH (*Astragalus alpinus*)	3	-	100
MOUSE EARED CHICKWEED (*Cerastium arvense*)	2	-	100
GRASSES			
KENTUCKY BLUEGRASS *(Poa pratensis)*	36	-	100
GRACEFUL SEDGE *(Carex praegracilis)*	32	-	100
SLENDER WHEATGRASS (*Agropyron trachycaulum*)	5	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC
NUTRIENT REGIME:
PERMESOTROPHIC
ELEVATION:
1832M
SOIL DRAINAGE: WELL
SLOPE: LEVEL
ECOLOGICAL STATUS SCORE: 0

FORAGE PRODUCTION KG/HA

GRASS	380
FORB	224
TOTAL	604

ECOLOGICALLY SUSTAINABLE STOCKING RATES
1.5 (1.7-0.9)HA/AUM OR
0.27(0.23-0.45) AUM/AC

SACFA17. Fireweed-Meadow rue/Sedge

(Epilobium angustifolium-Thalictrum venulosum/Carex spp.)

n=1 This community type was described in the Panther Corners forest land use zone adjacent to an abandoned air strip. The site was a moist site with a higher nutrient regime making it highly productive. This community type had not been extensively utilized by horses or wildlife and appears to be undergoing succession to a shrub dominated community type. Some invasion of agronomic species (smooth brome, bluegrass spp.) has occurred off the old airstrip into this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW			
(*Salix spp.*)	T	-	100
FORBS			
FIREWEED			
(Epilobium angustifolium)	37	-	100
VEINY MEADOW RUE			
(Thalictrum venulosum)	22	-	100
YARROW			
(*Achillea millefolium*)	13	-	100
AMERICAN VETCH			
(*Vicia americana*)	5	-	100
NORTHERN BEDSTRAW			
(*Galium boreale*)	4	-	100
GRASSES			
BLUEGRASS			
(Poa spp.)	1	-	100
SEDGE			
(Carex spp.)	21	-	100
SLENDER WHEATGRASS			
(*Agropyron trachycaulum*)	1	-	100
SMOOTH BROME			
(*Bromus inermis*)	3	-	100
HAIRY WILDRYE			
(*Elymus innovatus*)	13	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION: 1650 M

SOIL DRAINAGE:
MODERATELY WELL

SLOPE: LEVEL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTIONKG/HA

GRASS	1006
FORB	2134
TOTAL	3140

ECOLOGICALLY SUSTAINABLE STOCKING RATES
0.7 (1.2-0.5)HA/AUM OR
0.6 (.33-0.8)AUM/AC

SACFB1. Willow-Bog birch/Water sedge

(Salix spp.-Betula glandulosa/Carex aquatilis)

n=9 This shrub community appears on areas with very poor drainage. It is found in association with the wetter water sedge meadows. These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area. Increased flooding and prolonged waterlogging may result in the disappearance of willow and a transition to a water sedge meadow.

This community is similar to the water sedge-beaked sedge community in that it is found throughout the foothills and into the mountains. It maybe found in the Upper Foothills, Subalpine and lower Alpine subregions.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW			
(Salix spp)	30	1-67	100
BOG BIRCH			
(Betula glandulosa)	18	1-44	100
FORBS			
ELEPHANT'S HEAD			
(Pedicularis groenlandicum)	1	0-6	78
SMOOTH ASTER			
(Aster laevis)	2	0-8	56
ALPINE BISTORT			
(Polygonum viviparum)	1	0-6	78
SMOOTH LEAVED CINQUEFOIL			
(Potentilla diversifolia)	2	0-15	33
ENTIRE LEAVED GROUNDSEL			
(Senecio lugens)	2	0-13	22
GRASSES			
WATER SEDGE			
(Carex aquatilis)	32	0-91	67
TUFTED HAIRGRASS			
(Deschampsia cespitosa)	4	0-26	89
GRACEFUL SEDGE			
(Carex praegracilis)	2	0-20	11
BALTIC RUSH			
(Juncus balticus)	5	0-17	56

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1760(1600-1950) M

SOIL DRAINAGE:
MODERATELY WELL TO POORLY

SLOPE:
6(2-5)%

ASPECT:
SOUTHEASTERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1234(500-2320)
FORBS	129(0-354)
SHRUB	1150(0-2990)
TOTAL	2514(1870-3848)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40 (40.0-1.0) HA/AUM
.01(.01-0.4) AUM/AC

SACFB2. Willow/Horsetail

(Salix spp./ Equisetum spp.)

n=4 This community type occupies level to gently sloping, fluvial landforms at lower elevations in the subalpine. The sites are hygric and imperfectly to poorly drained. This community borders rivers and streams and is transitional to the spruce, subalpine fir, horsetail dominated forest.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. *(Salix spp.)*	32	5-56	100
BOG BIRCH *(Betula glandulosa)*	5	0-20	60
FORBS			
VARIEGATED HORSETAIL *(Equisetum variegatum)*	10	0-40	60
COMMON HORSETAIL *(Equisetum arvense)*	10	0-25	60
WOOLLY EVERLASTING *(Antennaria lanata)*	1	0-3	40
GRASSES			
SEDGE SPP. *(Carex spp.)*	14	3-25	100
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	1	0-3	60

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1512(1260-1810) M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

NONE AVAILABLE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40 (40.0-1.3) HA/AUM
.01(.01-.31) AUM/AC

SACFB3. Willow/Graceful sedge

(Salix spp./ Carex praegracilis)

n=6 This community type appears to represent a stage of succession onto tufted hairgrass meadows. When these communities are protected from disturbance (fire and grazing) willow and bog birch expand and tufted hairgrass declines. Willow growth also appears to favour the growth of tall forbs (veiny meadow rue, fireweed, aster) and slender wheatgrass. Fire has played a dominant role in controlling brush encroachment in the past and continued protection will allow continued shrub expansion, resulting in a decline in forage production.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. *(Salix spp.)*	35	18-55	100
BOG BIRCH (*Betula glandulosa*)	1	0-3	50
FORBS			
SMOOTH LEAVED CINQUEFOIL *(Potentilla diversifolia)*	8	0-44	50
STRAWBERRY *(Fragaria virginiana)*	4	0-17	50
YARROW *(Achillea millefolium)*	2	0-8	83
ALPINE BISTORT (*Polygonum viviparum*)	2	0-10	50
SMALL LEAVED EVERLASTING (*Antennaria parviflora*)	10	0-56	33
MEADOW RUE (*Thalictrum venulosum*)	3	0-15	17
GRASSES			
GRACEFULSEDGE *(Carex praegracilis)*	50	35-73	100
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	9	0-41	67
SLENDER WHEATGRASS (*Agropyron trachycaulum*)	3	0-13	33
SPIKED TRISETUM (*Trisetum spicatum*)	3	0-16	33

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1876(1832-1985) M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	806(380-1369)
FORBS	109(52-224)
SHRUBS	3(0-10)
TOTAL	919(604-1421)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.3(1.8-1.0) HA/AUM OR
0.31(.22-0.4) AUM/AC

SACFB4. Willow-Bog birch/Tufted hairgrass

(Salix glauca-Betula glandulosa/Deschampsia cespitosa)

n=14 This community type is found in association with the Tufted hairgrass-Sedge c.t.. Willow encroachment into a tufted hairgrass meadow eventually results in this community type. Historically fire has played an important role in the maintenance of the grassland community type in this ecoregion. Continued fire suppression will eventually allow willow and bog birch to invade many of these grassy meadows.

Willoughby (1998) found that the encroachment of willow into the Tufted hairgrass-Sedge c.t. caused a decline in forage production from 2200 kg/ha to 1800 kg/ha in the Upper Foothills subregion. This community has a high cover of willow and very little forage for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SMOOTH WILLOW .			
(Salix glauca)	26	0-65	86
BARRET'S WILLOW			
(Salix barrattiana)	6	0-55	43
BOG BIRCH			
(Betula glandulosa)	10	0-25	79
FORBS			
YARROW			
(Achillea millefolium)	1	0-3	43
WILD STRAWBERRY			
(Fragaria virginiana)	2	0-20	36
LINDLEY'S ASTER			
(Aster ciliolatus)	2	0-20	36
MOUNTAIN HELIOTROPE			
(Valeriana sitchensis)	3	0-35	43
TALL LARKSPUR			
(Delphinium glaucum)	1	0-5	43
WANDERING DAISY			
(Erigeron peregrinus)	3	0-15	29
GRASSES			
TUFTED HAIRGRASS			
(Deschampsia cespitosa)	19	2-35	100
HAIRY WILDRYE			
(Elymus innovatus)	2	0-5	36
SEDGE			
(Carex spp.)	10	0-26	86

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC TO SUBHYGRIC

NUTRIENT REGIME :
PERMESOTROPHIC

ELEVATION:
1828(1220-2210) M

SOIL DRAINAGE :
MOD. WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	950
FORBS	493
SHRUBS	265
TOTAL	1803 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.3(1.8-1.0) HA/AUM OR
0.31(.22-0.4) AUM/AC

SACFB5. Willow-Bog birch/Clover-Dandelion

(Salix glauca-Betula glandulosa/Trifolium repens-Taraxacum officinale)

n=1 This community type represents a Willow-Bog birch/Tufted hairgrass community that has been extensively grazed by horses. This community was described near a historic campsite in the South Ram river drainage. Long-term moderate grazing pressure or heavy grazing pressure over a couple of years causes tufted hairgrass to decline and allows sedge, slender wheatgrass, Kentucky bluegrass, clover and dandelion to increase (Willoughby 2005) These community types are highly productive for domestic livestock throughout the growing season, but the poor quality of Kentucky bluegrass, clover and dandelion, particularly, in the dormant season limits the use of these community types for wildlife.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SMOOTH WILLOW . *(Salix glauca)*	19	-	100
BOG BIRCH *(Betula glandulosa)*	10	-	100
FORBS			
YARROW *(Achillea millefolium)*	11	-	100
WILD STRAWBERRY *(Fragaria virginiana)*	4	-	100
DANDELION *(Taraxacum offincinale)*	15	-	100
CLOVER *(Trifolium repens)*	16	-	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	18	-	100
GRASSES			
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	10	-	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	6	-	100
SEDGE *(Carex spp.)*	12	-	100
KENTUCKY BLUEGRASS (*Poa pratensis*)	7	-	100
HAIRY WILDRYE (*Elymus innovatus*)	8	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1966 M

SOIL DRAINAGE :
MOD. WELL

SLOPE:
2%

ASPECT:
SOUTHEAST

ECOLOGICAL STATUS SCORE: 8

FORAGE PRODUCTION KG/HA

GRASS	1728
FORBS	199
TOTAL	1927

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.4(1.8-1.0) HA/AUM OR
.28(.22-0.4) AUM/AC

SACFB6. Willow-Bog birch/California oatgrass

(Salix glauca-Betula glandulosa/Danthonia californica)

n=19 This community type likely develops from willow encroaching onto an oatgrass dominated meadow. The oatgrass meadows are found on dry, gravelly soils. These meadows may also form in frost pockets. The spread of willow is likely caused by lack of natural disturbance, such as fire. The cover of willow on this community type is fairly extensive. This will restrict access to domestic livestock. This community type would be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SMOOTH WILLOW *(Salix glauca)*	22	0-75	90
BARRET'S WILLOW *(Salix barratiana)*	8	0-50	47
BOG BIRCH *(Betula glandulosa)*	7	0-50	58
FORBS			
YARROW *(Achillea millefolium)*	2	0-9	68
MOUNTAIN CINQUEFOIL *(Potentilla diversifolia)*	1	0-6	63
WILD STRAWBERRY *(Fragaria virginiana)*	9	0-33	90
WANDERING DAISY *(Erigeron peregrinus)*	1	0-6	42
GLOBEFLOWER *(Trollius albiflorus)*	2	0-25	26
NORTHERN VALERAIN *(Valeriana dioica)*	1	0-8	21
GRASSES			
CALIFORNIA OATGRASS *(Danthonia californica)*	24	10-70	100
SEDGE *(Carex spp.)*	4	0-21	68
MOUNTAIN TIMOTHY *(Phleum commutatum)*	4	0-35	68
HAIRY WILD RYE *(Elymus innovatus)*	1	0-15	32
SPIKED TRISTEUM *(Trisetum spicatum)*	3	0-20	68

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1888(1360-2340) M

SOIL DRAINAGE:
MODERATELY WELL TO WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	598
FORBS	418
SHRUBS	300
TOTAL	1316 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.3(1.8-1.0) HA/AUM OR
0.31(.22-0.4) AUM/AC

SACFB7. Willow-Bog birch/Hairy wildrye

(Salix glauca-Betula glandulosa/Elymus innovatus)

n=20 This community is typical of the valley bottoms where the low temperatures prohibit the growth of trees. Corns and Achuff (1982) described a similar community in the Banff and Jasper National Parks. They found this community type occupied coarse stream deposits which had repeated flooding.

Bork (1994) felt this community type developed from the invasion of willow and bog birch onto grasslands in the absence of disturbance in Willmore Wilderness park. Willow cover has increased, shading the growth of grasses and allowing tall-growing forbs, such as fireweed, aster and veiny meadow rue to increase. He felt continued protection from disturbance will allow succession to shrub and eventually tree species, which will increase shading of the understory vegetation and eventually lower forage production.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Trees			
White spruce			
(Picea glauca)	T	0-3	5
Shrubs			
Willow spp.			
(Salix glauca)	30	8-52	100
Bog birch			
(Betula glandulosa)	24	2-58	90
Forbs			
Northern valerian			
(Valeriana dioica)	4	0-11	75
Yarrow			
(Achillea millefolium)	3	0-8	95
Fireweed			
(Epilobium angustifolium)	3	0-11	65
Strawberry			
(Fragaria virginiana)	4	0-12	80
Tall larkspur			
(Delphinium glaucum)	3	0-10	85
Grasses			
Bog sedge			
(Kobriesia myosuroides)	5	0-16	55
Hairy wildrye			
(Elymus innovatus)	10	0-30	95
Graceful sedge			
(Carex praegracilis)	3	0-13	55
Slender wheatgrass			
(Agropyron trachycaulum)	3	0-13	85

Environmental Variables

Moisture Regime:
Xeric to subhygric

Nutrient Regime:
mesotrophic

Elevation:
1926(1560-2250) m

Soil Drainage:
Rapidly to moderately well

Slope:
3(1-10)%

Aspect:
Easterly

Ecological status score: 24

Forage Production Kg/Ha

grass	868(756-1003)
forbs	713(85-2120)
shrub	135(0-540)
Total	1716(1088-2898)

Ecologically sustainable stocking rate
1.0 (1.3-0.5)ha/aum or
0.4(.31-0.8) AUM/AC

SACFB8. Bog birch/Bog sedge-Sedge

(Betula glandulosa/Kobresia myosuroides-Carex spp.)

n=5 This community type was described on moist lowland sites at higher elevations in the Central and Northern foothills ecodistricts. It appears this community type originated from recent shrub encroachment onto sedge-bog sedge-tufted hairgrass community type. The presence of bog sedge may represent the transition between the foothills ecodistricts and the rocky mountain ecodistricts. Corns and Achuff (1982) described bog sedge dominated community types in the Central and Northern Rocky Mountains of the Subalpine subregion of Banff and Jasper National Parks. Camping and grazing of these communities by horses should be restricted.

PLANT COMPOSITION

PLANT COMPOSITION	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. *(Salix spp.)*	3	0-10	60
BOG BIRCH *(Betula glandulosa)*	27	12-40	100
FORBS			
SLENDER BLUE BEARDTONGUE *(Penstemon procerus)*	3	1-7	100
BEARBERRY *(Arctostaphylos uva-ursi)*	4	0-16	60
SMOOTH LEAVED CINQUEFOIL *(Potentilla diversitolia)*	5	0-19	80
OLD MAN'S WHISKERS *(Geum triflorum)*	3	0-9	80
ALPINE GOLDENROD *(Solidago multiradiata)*	2	0-5	60
GRASSES			
BOG SEDGE *(Kobresia myosuroides)*	26	16-45	100
GRACEFUL SEDGE *(Carex praegracilis)*	16	0-41	80
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	9	1-23	100
CALIFORNIA OATGRASS *(Danthonia californica)*	5	0-12	80

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1791(1530-2286) M

SOIL DRAINAGE:
MODERATELY WELL

SLOPE: 2(1-2)%

ASPECT: EASTERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1333(391-2848)
FORBS	390(88-695)
SHRUBS	202(0-807)
TOTAL	1925(683-3416)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0 (1.3-0.5) HA/AUM OR
0.4(.31-0.8) AUM/AC

SACFB9. Bog birch-Willow/Rough fescue

(Betula glandulosa-Salix spp./Festuca scabrella)

n=4 This community type is very similar to the Bog birch/Rough fescue-Sedge community described by Willoughby (1992) in the Upper Foothills subregion. Willoughby found that the rough fescue grasslands were located upslope of tufted hairgrass meadows on slightly drier, gravelly soils. Bork (1994), also described rough fescue dominated grasslands in Willmore Wilderness Park. This community type is also similar to the Bog birch/Rough fescue-Bog sedge community type but lacks the cover of bog sedge. Bog sedge tends to grow at higher elevations and appears to indicate the transition from the Upper Foothills subregion to the Subalpine subregion.

It appears the lack of fire on this community type has allowed the shrub cover to expand, reducing forage productivity for wildlife and domestic livestock. In one study, burning a Bog birch/Rough fescue community type twice in 3 year intervals controlled birch growth and increased total forage production by over 40% compared to the unburned control in the Upper Foothills subregion (Bork 1990).

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Bog birch *(Betula glandulosa)*	39	24-62	100
Willow spp. *(Salix spp.)*	13	0-26	75
Forbs			
American vetch *(Vicia americana)*	4	1-8	100
Smooth aster *(Aster laevis)*	2	1-5	100
Tall larkspur *(Delphinium glaucum)*	2	0-6	75
Old man's whiskers *(Geum triflorum)*	4	0-7	75
Fireweed *(Epilobium angustifolium)*	3	0-6	75
Grasses			
Rough fescue *(Festuca scabrella)*	19	10-31	100
Graceful Sedge *(Carex praegracilis)*	6	1-12	100
Slender Wheatgrass *(Agropyron trachycaulum)*	9	0-33	60
Hairy wildrye *(Elymus innovatus)*	3	0-6	50

Environmental Variables

Moisture Regime:
Mesic

Nutrient Regime:
Mesotrophic

Elevation:
1675(1600-1750) m

Soil Drainage:
Well

Slope:
5%

Aspect:
Variable

Ecological status score: 24

Forage Production Kg/Ha

Grass	1807(642-3564)
Forbs	705(492-902)
Shrubs	559(170-800)
Total	3071(2070-4226)

Ecologically sustainable stocking rate
1.0(1.3-0.4) ha/AUM or
0.4 (.31-1.0) AUM/AC

SACFB10. Bog birch/Rough fescue-Bog sedge

(Betula glandulosa/Festuca scabrella-Kobresia myosuroides)

n=1 This community type is very similar to the Bog birch-Willow/Rough fescue community previously described. Willoughby(2005) found that the rough fescue grasslands were located upslope of tufted hairgrass meadows on slightly drier, gravelly soils. Bork (1994), also described rough fescue dominated grasslands in Willmore Wilderness Park. The presence of bog sedge in this community type appears to indicate the transition from the Upper Foothills and lower Subalpine subregions to the Upper subalpine subregion.

It appears the lack of fire on this community type has allowed the shrub cover to expand, reducing forage productivity for wildlife and domestic livestock. In one study, burning a Bog birch/Rough fescue community type twice in 3 year intervals controlled birch growth and increased total forage production by over 40% compared to the unburned control in the Upper Foothills subregion (Bork 1990).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BOG BIRCH			
(Betula glandulosa)	30	-	100
WILLOW SPP.			
(Salix barclayi)	5	-	100
FORBS			
FALSE DANDELION			
(Agoseris glauca)	6	-	100
GRACEFUL CINQUEFOIL			
(Potentilla gracilis)	6	-	100
TALL LARKSPUR			
(Delphinium glaucum)	6	-	100
ALPINE GOLDENROD			
(Solidago multiradiata)	5	-	100
SHOW LOCOWEED			
(Oxytropis splendens)	5	-	100
GRASSES			
ROUGH FESCUE			
(Festuca scabrella)	85	-	100
GRACEFUL SEDGE			
(Carex praegracilis)	10	-	100
SLENDER WHEATGRASS			
(Agropyron trachycaulum)	34	-	100
BOG SEDGE			
(Kobresia myosuroides)	13	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1981 M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1201
FORBS	147
SHRUBS	0
TOTAL	1348

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0 (1.3-0.5)HA/AUM OR
0.4 (.31-0.8) AUM/AC

SACFB11. Willow/Fringed brome-Sedge
(Salix barclayi/Bromus ciliatus-Carex spp.)

n=1 This community was described on the banks of Forbidden Creek west of Rocky Mtn. House where the water table is high but flooding is rare. It occupies the fluvial terraces along the creek . A similar community type Willow/Fringed brome-Slender wheatgrass was described in the Lower Foothills subregion (Lawrence et al. 2005). The production of the Lower Foothills type averaged over 1700 kg/ha. This community type had only half the production (760 kg/ha). The more extreme climatic conditions of this site in the subalpine likely limits the growth of forage.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP.			
(Salix barclayi)	50	-	100
FORBS			
YARROW			
(Achillea millefolium)	8	-	100
GRACEFUL CINQUEFOIL			
(Potentilla gracilis)	9	-	100
ALPINE BISTORT			
(Polygonum viviparum)	43	-	100
OLD MAN'S WHISKERS			
(Geum triflorum)	8	-	100
GRASSES			
FRINGED BROME			
(Bromus ciliatus)	61	-	100
GRACEFUL SEDGE			
(Carex praegracilis)	62	-	100
ROUGH FESCUE			
(Festuca scabrella)	2	-	100
SLENDER WHEATGRASS			
(Agropyron trachycaulum)	15	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
2286 M

SOIL DRAINAGE:
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	472
FORBS	288
TOTAL	760

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.3(1.8-1.0) HA/AUM OR
0.31(.22-0.4) AUM/AC

SUBALPINE SUBREGION

CENTRAL AND NORTHERN ROCKY MOUNTAINS

NATIVE GRASSLANDS AND SHRUBLANDS

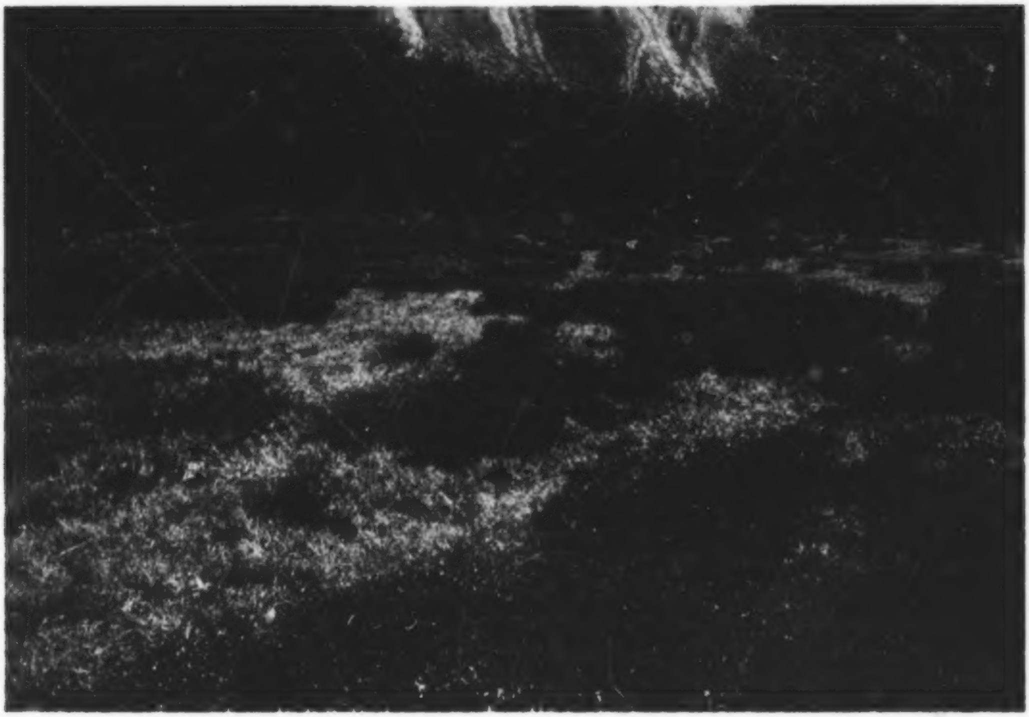


Figure 4. The presence of bog sedge in this Willow-Bog birch/Bog sedge community indicates the transition to the higher and steeper Central and Northern Rocky Mountains of the Subalpine subregion. Note the transition from the Subalpine to Alpine subregions in the background.

Native grass and shrubland ecology Mountain ecodistricts

The native grass and shrubland community types in the Central and Northern Rocky Mountains of the Subalpine subregion (Table 3) are found in the valley bottoms adjacent to streams and rivers. The tufted hairgrass, California oatgrass and rough fescue dominated community types described previously in the foothills can also be found in the mountains, but these grassland community types are more common in the foothills and therefore were described in that section of the guide.

There are a number of grassland community types in the Central and Northern Rocky Mountains which are unique and appear to represent a transition from the lower subalpine mountain ecodistricts to the Alpine subregion. These include the hairy wildrye, junegrass and shrubby cinquefoil dominated community types (SACMA3,4,5,6) which are found on steep south facing slopes, at higher elevations throughout the mountains (Figure 2). Near timberline there is a unique forb dominated (globeflower,wandering daisy, mountain marigold, mountain heliotrope) community type found on imperfectly to well drained sites. The presence of bog sedge (*Kobresia myosuroides*) in the Bog sedge-California oatgrass community type appears to indicate the transition from the lower Central and Northern Rocky Mountains to the Alpine subregion. Ogilvie (1969) and Corns and Achuff (1982), described bog sedge dominated community types in the higher elevations of the subalpine and alpine of the Rocky Mountains of Banff and Jasper National Parks.

The maintenance of the grassland community types in the mountains is extremely fire dependent. The lack of fire quickly allows bog birch and willow to expand shading the modal grassland community types. Prolonged shading causes the understory composition to shift from a tufted hairgrass-California oatgrass dominated understory to a slender wheatgrass-hairy wildrye dominated understory. Under a heavy shrub cover there is little forb or grass cover. The sequence of the grassland and shrubland community types unique to the mountain ecodistricts is outlined in figures 3 and 5. These figures represent the transition from willow, bog birch dominated communities in the valley bottoms to the grass and dwarf shrublands in the upper Subalpine and Alpine subregions.

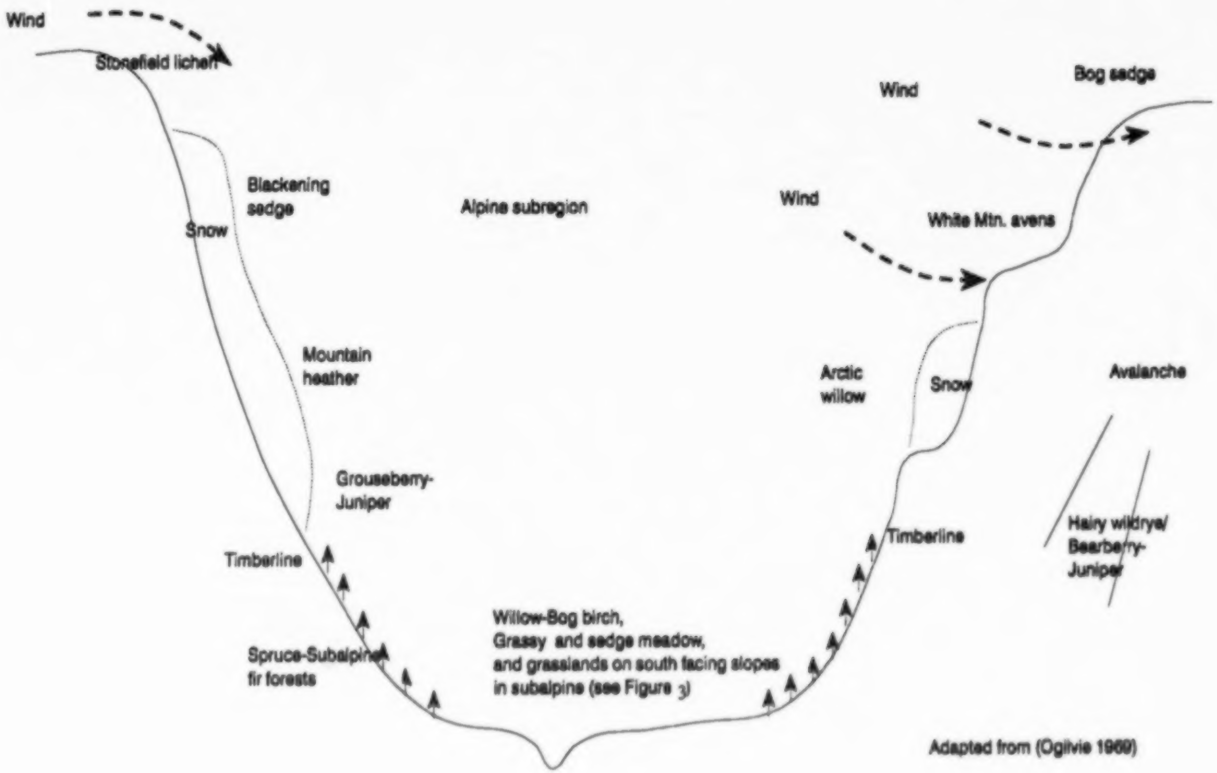
Many of these subalpine grass and shrublands are very fragile because of exposure and cold climate. The forage productivity is generally only half of what is found in the lower Upper Foothills subregion and recovery from overgrazing will likely take some time because of the poor growing conditions. As a result grazing by domestic livestock should be done with caution.

Table 3. Native grass and shrublands of the Central and Northern Rocky Mountain ecodistricts of the Subalpine subregion

Community number	Community type	Productivity (kg/ha) Grass	Forb	Shrub	Total	Moisture	Drainage	Carrying capacity (ha/AUM)
a1	**shrubby grassland**				**N/A**	**Subxeric**	**Rapidly**	**40.0**
SACMB5.	Bog birch-Juniper				N/A	Subxeric	Rapidly	40.0
a2	**graminoid grassland**				**N/A**	**Subxeric**	**Rapidly**	**40.0**
SACMA7.	Northern wheatgrass				N/A	Subxeric	Rapidly	40.0
b2	**bearberry grassland**	**234**	**155**	**1017**	**1407**	**Xeric**	**Rapidly**	**3.0**
SACMA4.	Bearberry-Juniper	234	155	1017	1407	Xeric	Rapidly	3.0
bb1	**yellow mtn. avens**				**N/A**	**Subxeric**	**Rapidly**	**40.0**
SACMA9.	Yellow mountain avens				N/A	Subxeric	Rapidly	40.0
c4	**hairy wildrye grassland**				**N/A**	**Subxeric**	**Rapidly**	**3.5**
SACMA3.	Shrubby cinquefoil/Hairy wildrye				N/A	Xeric	Rapidly	3.0
SACMA5.	Junegrass-Hairy wildrye-Brome				N/A	Subxeric	Rapidly	4.0
SACMA6.	Hairy wildrye/Bearberry-Juniper				N/A	Mesic	Well	4.0
d3	**rhododendron-mesic Fa**				**N/A**	**Mesic**	**Well**	**40.0**
SACMB8.	Subalpine fir				N/A	Mesic	Well	40.0
d4	**California oatgrass**				**N/A**	**Submesic**	**Well**	**22.0**
SACMA1.	Bog sedge-California oatgrass					Mesic	Well	2.5
SACMA8.	Alpine bluegrass				N/A	Submesic	Well	40.0
d6	**grouseberry**				**N/A**	**Mesic**	**Well**	**40.0**
SACMB7.	Grouseberry/Juniper				N/A	Mesic	Well	40.0
dd2	**shrubland**				**N/A**	**Subhygric**	**Mod. well**	**2.5**
SACMB4.	Willow-Bog birch/Bog sedge				N/A	Subhygric	Mod. well	2.5
e1	**shrubland**				**N/A**	**Subhygric**	**Mod. well**	**1.4**
SACMB2.	Willow-Bog birch/Sedge				N/A	Subhygric	Poorly	1.4
SACMB3.	Willow-Bog birch/Hairy wildrye				N/A	Subhygric	Mod. well	1.4

Table 3. cont'd

Community number	Community type	Production(kg/ha) Grass	Forb	Shrub	Total	Moisture	Drainage	Carrying capacity (ha/AUM)
SACMB6.	Willow/Forb				N/A	Mesic	Imperfectly	40.0
e2	**forb meadow**				**N/A**	**Mesic to Hygric**	**Poorly**	**40.0**
SACMA2.	Forb meadows				N/A	Mesic to Hygric	Poorly	40.0
i2	**shrubby fen**	**2320**	**24**		**2344**	**Hygric**	**Poorly**	**40.0**
SACMB1.	Willow-Bog birch/Water sedge	2320	24		2344	Hygric	Poorly	40.0


Wind
Stonefield lichen
Blackening sedge
Snow
Alpine subregion
Mountain heather
Grouseberry-Juniper
Timberline
Spruce-Subalpine fir forests
Willow-Bog birch,
Grassy and sedge meadow,
and grasslands on south facing slopes
in subalpine (see Figure 3)
Bog sedge
Wind
Wind
White Mtn. avens
Arctic willow
Snow
Avalanche
Timberline
Hairy wildrye/
Bearberry-
Juniper

Adapted from (Ogilvie 1969)

Figure 5. Sequence of plant communities in the Alpine subregion

Native grass and shrublands in Central and Northern Mountain and Foothills areas

1. Community above timberline (Alpine subregion).........**Alpine section of guide**
   Community not above timberline, meadows, shrublands or south facing slopes dominated by shrubs and grass.......................... **2**
2. Moist sites, community dominated by shrubs >20% cover (willow, bog birch) or timberline communities with dwarf trees or grouseberry .... **see shrub key pg 34**
   Drier to moist sites shrub cover <10% site dominated by grasses and forbs................. **3**
3. Community very wet free standing water, dominated by sedge, cottongrass or tufted bulrush **4**
   Community drier, dominated by tufted hairgrass, rough fescue, california oatgrass, hairy wildrye, juniper or bearberry.......................... **6**
4. Very wet nutrient rich sites dominated by water or beaked sedge.......................**SACFA1**
   Very wet nutrient poor, acidic sites dominated by tufted bulrush and cottongrass............. **5**
5. Site dominated by tufted bulrush..........................**SACFA2**
   Site dominated by cottongrass and sedge..........................**SACFA3**
6. Grasslands of meadows and lowland areas.......................... **7**
   Grasslands of south facing slopes, or windswept ridges, hairy wildrye, bearberry, white mtn. avens dominated **20**
7. Higher elevation sites near or at timberline, moist sites dominated by wandering daisy, globeflower, mountain marigold..........................**SACMA2**
   Lower elevation sites, valley bottoms adjacent to streams or rivers or if higher elevation dry sites dominated by bog sedge.......................... **8**
8. Disturbed or grazed community types dominated by Kentucky bluegrass, creeping red fescue, dandelion, alpine bluegrass, alpine timothy or fireweed.......................... **9**
   Undisturbed community types dominated by rough fescue, California oatgrass, bog sedge, tufted hairgrass, and sedge species.......................... **14**
9. Moderately grazed site native increasers dominant (slender wheatgrass, sedge, fringed brome, rocky mtn. fescue, alpine timothy), Alpine or Kentucky bluegrass increasing in cover.......................... **10**
   Heavily grazed sites dominated by Kentucky bluegrass or abandoned airstrips dominated by creeping red fescue or native forb species (fireweed, veiny meadow rue).......................... **12**
10. Site dominated by Alpine bluegrass..........................**SACMA8**
    Site dominated by rocky mtn. fescue, alpine timothy, sedge, slender wheatgrass, fringed brome (moister sites).......................... **11**
11. Site dominated by rocky mtn. fescue, alpine timothy, sedge....................... **SACFA6**
    Site dominated by slender wheatgrass, sedge, fringed brome.....................**SACFA7**
12. Heavily grazed site dominated by Kentucky bluegrass and dandelion........**SACFA16**
    Abandoned airstrips dominated by creeping red fescue, or invaded strips dominated by forbs (fireweed, veiny meadow).......................... **13**

13 Site dominated by creeping red fescue..........................**SACFA15**
   Moister disturbed site dominated by fireweed and veiny meadow rue...**SACFA17**

14. Moist sites dominated by sedge and tufted hairgrass.......................... **15**
    Drier sites dominated by rough fescue, hairy wildrye, bog sedge, yellow dryas or California oatgrass.......................... **16**
15. Site dominated by tufted hairgrass, sedge co-dominant..........................**SACFA4**
    Site dominated by sedge, tufted hairgrass co-dominant..........................**SACFA5**

16. Sites dominated by rough fescue and hairy wildrye..........................**SACFA9**
    Sites dominated by California oatgrass, bog sedge, or yellow dryas............................. **17**
17. Gravelly river flats dominated by yellow dryas..........................**SACMA9**
    Meadow areas dominated by California oatgrass and/or bog sedge.............................. **18**
18. Site dominated by bog sedge and california oatgrass.......................... **19**
    Site dominated by california oatgrass and sedge, bog sedge not present.........**SACFA8**
19. Site dominated by bog sedge, california oatgrass, drier sites..........................**SACMA1**
    Site co-dominated by bog sedge, tufted hairgrass, and sedge moister sites... **SACFA13**
20. Lower elevation grasslands in the Foothills of the Subalpine.......................... **21**
    Higher elevation grasslands in the mountains of the Subalpine.......................... **22**

21 Northern wheatgrass dominated site..........................**SACMA7**

Fringed sage, sedge and junegrass dominated slope.......................... **SACFA12**
22. Avalanche slopes dominated by hairy wildrye, juniper, and bearberry.... **SACMA6**
Drier sites or windswept ridges dominated hairy wildrye, juniper, bearberry, shrubby cinquefoil, white mtn. avens.. **23**
23. Windswept ridges dominated by white mtn. avens.......................... **SACFA14**
South facing slopes dominated by hairy wildrye.................................... **24**
24. Shallow rocky soils with little grass cover, site dominated by bearberry.. **SACMA4**
Deeper soils, good grass cover dominated by hairy wildrye, junegrass.................... **25**
25. Shrubby cinquefoil dominant in stand.. **SACMA3**
Grass cover extensive, dominated by hairy wildrye, junegrass, and brome.... **SACMA5**

Shrub dominated communities

1. Timberline communities dominated by whitebark pine, subalpine fir, grouseberry, or willow communities with marsh marigold, wandering daisy or globeflower in understory.................................... **2**
Riparian communities adjacent to streams or rivers.................................... **5**
2. Trees present in community (whitebark pine, subalpine fir) or grouseberry dominated.... **3**
Moist seepage areas at treeline dominated by globeflower, wandering daisy or marsh marigold in understory.. **SACMB6**
3. Trees (subalpine fir, whitebark pine) on site.................................... **4**
Grouseberry dominated shrubland.................................... **SACMB7**
4. Whitebark pine present.. **SACMB3**
Subalpine fir present.. **SACMB8**
5. Very wet sites with water sedge or horsetail dominated understories.......................... **6**
Drier sites with tufted hairgrass, california oatgrass, bog sedge, hairy wildrye, rough fescue Kentucky bluegrass, dandelion dominated understories.. **7**
6. Water sedge dominated understory.. **SACFB1, SACMB1**
Horsetail dominated understory.. **SACFB2**
7. Grazed communities dominated by clover and dandelion in understory................ **SACFB5**
Ungrazed sites dominated by native forbs and grasses in understory.......................... **8**
8. Shrubland communities on seepage areas on south facing slopes with shallow soils, dominated by bog birch and juniper.. **SACMB5**
Meadows and lowland shrublands dominated by rough fescue, bog sedge, california oatgrass, tufted hairgrass, hairy wildrye or sedge in the understory.. **9**
9. Rough fescue dominates the understory.. **10**
Tufted hairgrass, california oatgrass, bog sedge, sedge, hairy wildrye dominate................ **11**
10. Rough fescue and bog sedge dominate understory higher elevations................ **SACFB10**
Rough fescue dominates, bog sedge not present lower elevations...................... **SACFB9**
11. Moister sites with deep fluvial deposits dominated by tufted hairgrass, sedge, or fringed brome in understory.. **12**
Drier sites which are well drained at the surface dominated by hairy wildrye, sedge, bog sedge or california oatgrass in understory.. **14**
12. Tufted hairgrass or sedge dominated understory.................................... **13**
Fluvial areas with Fringed brome dominated understory, lower elevation......... **SACFB11**
13. Tufted hairgrass dominates understory.. **SACFB4**
Graceful sedge and other sedge species dominate understory.............................. **SACFB3, SASMB2**
14. Modal sites with hairy wildrye and sedge dominating understory.......................... **15**
Sites dominated by california oatgrass or bog sedge in understory.......................... **16**
15. Hairy wildrye dominates understory.. **SACFB7,SACMB3**
Graceful sedge and other sedge species dominate understory......................... **SACFB3, SASMB2**
16. California oatgrass dominates understory.. **SACFB6**
Bog sedge dominates understory.. **SACFB8, SACMB4**

SACMA1. Bog sedge-California oatgrass

(Kobresia myosuroides-Danthonia californica)

n=1 This community type appears to represent the transition from the foothills ecodistricts to the mountain ecodistricts of the subalpine. It appears that tufted hairgrass, california oatgrass and rough fescue all decline and bog sedge increases as there is an increase in elevation and change from the foothills to the mountains.

This community type is found on level to gently sloping valley bottoms with mesic moisture regimes. The presence of California oatgrass maybe indicative of a well drained, gravelly site. In the Yukon the California oatgrass dominated community types were found to form in depressions which appeared to act as pronounced frost pockets (Bailey et al. 1992). Bog sedge also appears to be adapted to these site condition (Oglivie 1969).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW *(Salix spp.)*	2	-	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	25	-	100
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	15	-	100
YARROW *(Achillea millefolium)*	1	-	100
SMALL LEAVED EVERLASTING *(Antennaria parviflora)*	1	-	100
GRASSES			
CALIFORNIA OATGRASS *(Danthonia californica)*	35	-	100
BOG SEDGE *(Kobresia myosuroides)*	25	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1850 M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
2.5(40.0-2.0) HA/AUM
0.16(.01-0.2) AUM/AC

SACMA2. Forb meadows

(Trollius albiflorus, Erigeron peregrinus, Anemone occidentalis, Caltha leptosepala)

n=17 These forb dominated meadows include both the Caltha leptosepala-Trollius albiflorus and Erigeron peregrinus-Valeriana sitchensis community types described by Corns and Achuff (1982). These meadows occupy mesic to hygric, gently sloping, upper subalpine to alpine areas. The soils are imperfectly to well drained Gleysols on fluvial and morainal landforms. On the poorly to imperfectly drained sites in areas where snow melts late and seepage is received throughout the growing season mountain marigold and globeflower predominate. In contrast on better drained, drier sites fleabane and mountain heliotrope predominate.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
ARCTIC WILLOW *(Salix arctica)*	1	0-5	59
WESTERN MOUNTAIN HEATHER *(Cassiope mertensiana)*	3	0-10	47
FORBS			
WANDERING DAISY *(Erigeron peregrinus)*	9	0-10	88
WOOLY EVERLASTING *(Antennaria lanata)*	4	0-35	65
GLOBEFLOWER *(Trollius albiflorus)*	13	0-40	82
MOUNTAIN HELIOTROPE *(Valeriana sitchensis)*	9	0-20	82
MOUNTAIN MARIGOLD *(Caltha leptosepala)*	5	0-23	53
CHALICEFLOWER *(Anemone occidentalis)*	7	0-20	70
GRASSES			
BLACKENING SEDGE *(Carex nigrescens)*	2	0-20	35
MOUNTAIN TIMOTHY *(Phleum commutatum)*	1	0-2	41
SEDGE *(Carex spectabilis)*	1	0-10	23

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
2024 (1850-2300) M

SOIL DRAINAGE:
IMPERFECTLY TO WELL

SLOPE:
27(3-55)%

ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-1.0) HA/AUM
.01(.01-0.4) AUM/AC

SACMA3. Shrubby cinquefoil/Hairy wildrye

(Potentilla fruticosa/Elymus innovatus)

n=5 Corns and Achuff (1982), described this community type on subxeric to xeric, south facing slopes in Banff and Jasper. The soils are rapidly to well drained Regosols on colluvial, eolian and glacial landforms. On more stable sites they felt succession would be to a Lodgepole pine/Juniper/Bearberry community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL. *(Potentilla fruticosa)*	20	4-40	100
BOG BIRCH *(Betula glandulosa)*	2	0-5	40
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	1	0-3	20
WHITE MOUNTAIN AVENS *(Dryas integrifolia)*	3	0-15	20
STRAWBERRY *(Fragaria virginiana)*	6	0-10	60
ALPINE FORGET-ME-KNOT *(Myosotis alpestris)*	5	0-15	40
SWEET-FLOWERED ANDROSACE *(Androsace chamaejasme)*	4	0-15	40
WANDERING DAISY *(Erigeron peregrinus)*	2	0-11	20
SPOTTED SAXIFRAGE *(Saxifraga bronchialis)*	3	0-13	20
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	3	0-10	60
BLUNT SEDGE *(Carex obtusata)*	1	0-4	20
NORWAY SEDGE *(Carex norvegica)*	8	0-40	20
BROAD GLUMED WHEATGRASS *(Agropyron violaceum)*	5	0-25	20

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
1720(1500-1800) M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
28 (15-55)%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

NOT AVAILABLE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
3.5(40.0-3.0) HA/AUM
0.11(.01-.13) AUM/AC

SACMA4. Bearberry-Juniper

(Arctostaphylos uva-ursi-Juniperus communis)

n=14 This community type is very similar to the previously describe Shrubby cinquefoil/Hairy wildrye dominated community type. Both community types occupy rapidly drained, steep south facing slopes. This community type is distinguished from the Shrubby cinquefoil community type by the presence of a high cover of bearberry and juniper and a low cover of shrubby cinquefoil. This community type is much drier than the shrubby cinquefoil type and is located on much steeper slopes.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	0-18	72
GROUND JUNIPER *(Juniperus communis)*	9	0-25	92
SMOOTH WILLOW *(Salix glauca)*	2	0-10	43
FORBS			
STRAWBERRY *(Fragaria virginiana)*	1	0-3	64
WHITE CAMUS *(Zigadenus elegans)*	1	0-8	50
MOUNTAIN VALERIAN *(Valeriana sitchensis)*	1	0-7	14
HARE BELL *(Campanula rotundifolia)*	1	0-5	43
TWINFLOWER *(Linnaea borealis)*	1	0-5	14
BEARBERRY *(Arctostaphylos uva-ursi)*	19	8-55	100
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	2	0-10	50
SPIKED TRISETUM *(Trisetum spicatum)*	T	0-1	21
JUNEGRASS *(Koeleria macrantha)*	1	0-5	43
SEDGE SPP. *(Carex spp.)*	1	0-6	54

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
1901(1700-2000) M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
60(55-71)%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	234 (163-312)
FORB	155 (97-176)
SHRUB	1017 (0-1743)
TOTAL	1407 (488-2003)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
3.0(40.0-2.5)HA/AUM
.13(.01-.16) AUM/AC

SACMA5. Junegrass-Hairy wildrye-Brome

(Koeleria macrantha-Elymus innovatus-Bromus inermis)

n=22 This community type was described by Corns and Achuff (1982) on subxeric, steep south facing slopes in the Front ranges east of Banff and Jasper. It is very similar to the bearberry and shrubby cinquefoil community types previously described, but this community type has better developed soils (Brunisols) than the Regosolic soils of the other community types.

This community type is also similar to the Pasture sagewort/Junegrass and Junegrass-Plains reed grass community types described by Willoughby et al (2005) and Stringer (1973) in the lower Montane subregion and the Junegrass/Sage community type described in the Upper Foothills subregion (Willoughby 2005). The high elevations of this community distinguishes this community type from the lower elevation grasslands (Corns and Achuff 1982).

PLANT COMPOSITION	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(*Potentilla fruticosa*)	1	0-6	59
FORBS			
SLENDER BLUE BEARDTONGUE			
(Penstemon procerus)	T	0-2	27
YARROW			
(Achillea millefolium)	2	0-15	82
SHOWY LOCOWEED			
(Oxytropis splendens)	2	0-15	59
BEARBERRY			
(Arctostaphylos uva-ursi)	1	0-10	41
YELLOW HEDYSARUM			
(Hedysarum sulphurscens)	5	0-15	50
SMALL LEAVED EVERLASTING			
(*Antennaria parviflora*)	3	0-15	36
GRASSES			
ROCKY MOUNTAIN FESCUE			
(Festuca saximontana)	T	0-1	18
JUNEGRASS			
(Koeleria macrantha)	15	0-35	96
HAIRY WILDRYE			
(Elymus innovatus)	17	0-55	82
SEDGE			
(Carex spp.)	1	0-10	54
BROME			
(Bromus inermis)	10	0-30	64

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
1964(1910-2100) M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
49(40-56)%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
4.0(40.0-2.0) HA/AUM
0.1(.01-0.2) AUM/AC

SACMA6. Hairy wildrye/Bearberry-Juniper

(Elymus innovatus/Arctostaphylos uva-ursi-Juniperus communis)

n=36 Ogilvie (1969) and Corns and Achuff (1982), described this community type on steep south-facing slopes, with stoney, black soils. This community type is also subjected to frequent snow avalanching, particularly during the spring when the snow is melting. This community type is moister than the junegrass, bearberry and shrubby cinquefoil communities previously described. This is likely the result of the increased snow cover. The soils are Melanic Brunisols and Humic Regosols, which are better developed than the drier community types previously described.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
JUNIPER *(Juniperus communis)*	6	0-30	63
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	0-24	44
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	16	0-60	76
WILD STRAWBERRY *(Fragaria virginiana)*	2	0-15	74
WHITE CAMAS *(Zigadenus elegans)*	1	0-7	39
FIREWEED *(Epilobium angustifolium)*	1	0-5	46
TWINFLOWER *(Linnaea borealis)*	1	0-35	11
YELLOW HEDYSARUM *(Hedysarum sulphurscens)*	3	0-25	39
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	44	0-70	98
JUNEGRASS *(Koeleria macrantha)*	1	0-5	28
CALIFORNIA OATGRASS *(Danthonia californica)*	15	0-40	13
RED FESCUE *(Festuca rubra)*	1	0-30	2
SPIKED TRISETUM *(Trisetum spicatum)*	1	0-5	28

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1942(1380-2300)M

SOIL DRAINAGE:
WELL

SLOPE:
52(0-80)%

ASPECT:
SOUTH

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
4.0(40.0-2.5) HA/AUM
.1(.01-.16) AUM/AC

SACMA7. Northern wheatgrass

(Agropyron dasystachyum)

n=3 This community type occurs on steep south facing slopes, with shallow soils, at lower elevations in the subalpine. It is very similar to the northern wheatgrass community type described by Willoughby et al. (2005) and Corns and Achuff (1982) in the Montane subregion of Banff and Jasper. This community type is distinguished from the other hairy wildrye, junegrass, bearberry and shrubby cinquefoil community types by the presence of northern wheatgrass and the lower elevations. The inaccessibility and fragile nature of the soils make this community type unsuitable for grazing.

PLANT COMPOSITION

PLANT COMPOSITION	CANOPY COVER(%) MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE *(Rosa acicvlaris)*	1	0-1	67
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	T	0-1	33
SHOWY LOCOWEED *(Oxytropis splendens)*	1	0-3	67
FIREWEED *(Epilobium angustifolium)*	2	0-5	67
WESTERN MEADOW RUE *(Thalictrum occidentalis)*	6	0-18	33
COMMON YARROW *(Achillea millefolium)*	1	1-2	100
GRASSES			
JUNEGRASS *(Koeleria macrantha)*	3	0-5	67
ALPINE TIMOTHY *(Phleum commutatum)*	1	0-2	67
BLUNT SEDGE (*Carex obtusata*)	1	0-1	67
HAIRY WILDRYE (*Elymus innovatus*)	3	0-10	33
NORTHERN WHEATGRASS (*Agropyron dasystachyum*)	30	0-15	67

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC-XERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

SLOPE:
31 (30-60)%

ASPECT:
SOUTHERLY

ELEVATION:
1720(1220-1859)M

SOIL DRAINAGE:
RAPIDLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

TOTAL 400 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-4.0)HA/AUM
.01(.01-0.1) AUM/AC

SACMA8. Alpine bluegrass

(Poa alpina)

n=1 The ecology of this community type is unclear. It was described on a gentle, easterly slope in the lower subalpine. Alpine bluegrass is known to grow in meadows, tundra and rocky slopes and is often abundant where the ground has been compacted (MacKinnon et al. 1992). It is possible that this community type could have been described adjacent to a game or hiking trail.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
DWARF BILBERRY (*Vaccinium caespitosum*)	6	-	100
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	4	-	100
FORBS			
STRAWBERRY (*Fragaria virginiana*)	20	-	100
FIREWEED (*Epilobium angustifolium*)	4	-	100
BALSAM GROUNDSEL (*Senecio pauperculus*)	3	-	100
GRASSES			
ALPINE BLUEGRASS (*Poa alpina*)	45	-	100
ROCKY MOUNTAIN FESCUE (*Fescue brachyphylla*)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
1800M

SOIL DRAINAGE:
WELL

SLOPE:
4%

ASPECT:
EASTERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-3.0)HA/AUM
.01(.01-.13) AUM/AC

SACMA9. Yellow mountain avens

(Dryas drummondil)

n=4 Corns and Achuff (1982), described this community type on recent fluvial and glacialfluvial landforms with gentle slopes. The soils are rapidly drained. Willoughby et al. (2005), described a yellow mountain avens community type on dry, gravelly river flats with nutrient poor soils in the Montane subregion. They found this community type to be successionally immature and succession would be to a Balsam poplar dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
YELLOW MOUNTAIN AVENS *(Dryas drummondii)*	50	25-50	100
WILLOW SPP. *(Salix spp.)*	5	0-20	50
FORBS			
ALPINE GOLDENROD *(Solidago multiradiata)*	T	0-1	25
BROAD LEAVED FIREWEED *(Epilobium latifolium)*	1	0-1	50
SHOWY LOCOWEED *(Oxytropis splendens)*	1	0-3	25
GRASSES			
SEDGE *(Carex spp)*	T	0-2	25

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1542 (1450-1670)M

SOIL DRAINAGE:
RAPIDLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
(40.0(40.0–8.5) HA/AUM
.01(.01-0.04) AUM/AC

SACMB1. Willow/Water sedge

(Salix spp./Carex aquatilis)

n=23 This shrub community appears on areas with very poor drainage. It is found in association with the wetter water sedge meadows. These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area. Increased flooding and prolonged waterlogging may result in the disappearance of willow and a transition to a water sedge meadow.

This community is similar to the water sedge-beaked sedge community in that it is found throughout the foothills and into the mountains. It maybe found in the Upper Foothills, Subalpine and lower Alpine subregions.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW			
(Salix spp)	27	0-75	96
BOG BIRCH			
(Betula glandulosa)	7	0-38	70
FORBS			
ELEPHANT'S HEAD			
(Pedicularis groenlandicum)	1	0-7	30
DWARF RASPBERRY			
(Rubus arcticus)	1	0-4	30
ALPINE BISTORT			
(Polygonum viviparum)	T	0-1	17
WANDERING DAISY			
(Erigeron peregrinus)	1	0-3	22
GRASSES			
WATER SEDGE			
(Carex aquatilis)	50	15-80	100
TUFTED HAIRGRASS			
(Deschampsia cespitosa)	3	0-30	26
SEDGE			
(Carex spp.)	9	0-20	4
BALTIC RUSH			
(Juncus balticus)	T	0-1	4

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC-HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1747(1340-1970) M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	2320
FORBS	24
TOTAL	2344

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-1.0) HA/AUM
.01(.01-0.4) AUM/AC

SACMB2. Willow-Bog birch/Sedge

(Salix glauca-Betula glandulosa/Carex spp.)

n=21 This community type is found in association with the Tufted hairgrass-Sedge or California oatgrass community type. Willow encroachment into grassland meadows eventually results in this community type. Historically fire has played an important role in the maintenance of the grassland community type in this subregion. Continued fire suppression will eventually allow willow and bog birch to invade many of the grassy meadows.

This community type is slightly drier than the Willow/Water sedge dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SMOOTH WILLOW . *(Salix glauca)*	11	0-30	67
BARRET'S WILLOW *(Salix barrattiana)*	15	0-55	71
BOG BIRCH *(Betula glandulosa)*	12	0-30	81
FORBS			
YARROW *(Achillea millefolium)*	1	0-5	43
WILD STRAWBERRY *(Fragaria virginiana)*	3	0-23	57
WANDERING DAISY *(Erigeron peregrinus)*	1	0-8	38
MOUNTAIN HELIOTROPE *(Valeriana sitchensis)*	T	0-5	23
GLOBEFLOWER *(Trollius albiflorus)*	2	0-7	38
WOOLLY EVERLASTING *(Antennaria lanata)*	1	0-12	33
GRASSES			
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	1	0-4	29
CALIFORNIA OATGRASS *(Danthonia californica)*	2	0-10	19
SEDGE *(Carex spp.)*	23	0-73	95

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC -HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1793(1370-2110) M

SOIL DRAINAGE:
MOD. WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
1.4(1.8-1.0) HA/AUM
.28(.22-0.4) AUM/AC

SACMB3. Willow-Bog birch/Hairy wildrye

(Salix glauca-Bog birch/Elymus innovatus)

n=17 This community is typical of the valley bottoms where the low temperatures prohibit the growth of trees. Corns and Achuff (1982) described a similar community in the Banff and Jasper National Parks. They found this community type occupied coarse stream deposits which had repeated flooding.

Bork (1994) felt this community type developed from the invasion of willow and bog birch onto grasslands in the absence of disturbance in Willmore Wilderness park. Willow cover has increased, shading the growth of grasses and allowing tall-growing forbs, such as fireweed, aster and veiny meadow rue to increase. He felt continued protection from disturbance will allow succession to shrub and eventually tree species. This community is typical of the valley bottoms throughout the subalpine in both the foothills and mountain ecodistricts.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ENGELMANN SPRUCE			
(Picea engelmannii)	T	0-1	18
SHRUBS			
WILLOW SPP.			
(Salix glauca)	36	0-85	36
BOG BIRCH			
(Betula glandulosa)	17	0-65	59
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	2	0-12	47
FORBS			
NORTHERN VALERIAN			
(Valeriana dioica)	T	0-1	12
YARROW			
(Achillea millefolium)	1	0-4	71
FIREWEED			
(Epilobium angustifolium)	3	0-20	59
STRAWBERRY			
(Fragaria virginiana)	5	0-20	82
TALL LARKSPUR			
(Delphinium glaucum)	3	0-10	65
VEINY MEADOW RUE			
(Thalictrum venulosum)	T	0-2	6
GRASSES			
BOG SEDGE			
(Kobriesia myosuroides)	1	0-13	12
HAIRY WILDRYE			
(Elymus innovatus)	17	0-50	94
SEDGE			
(Carex spp)	1	0-5	23
TUFTED HAIR GRASS			

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1859(1400-2240) M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
1.4(1.8-1.0) HA/AUM
.28(.04-.22) AUM/AC

SACMB4. Willow-Bog birch/Bog sedge

(Salix spp.-Betula glandulosa/Kobresia myosuroides)

n=14 This community type was described on moist lowland sites at higher elevations in the Central and Northern Rocky Mountain ecodistricts. It appears this community type originated from recent shrub encroachment onto sedge-bog sedge-tufted hairgrass community type. The presence of bog sedge may represent the transition between the foothills ecodistricts and the rocky mountain ecodistricts. Corns and Achuff (1982) described bog sedge dominated community types in the Central and Northern Rocky Mtn. ecodistricts of the Subalpine subregion of Banff and Jasper National Parks.

PLANT COMPOSITION	**CANOPY COVER(%)**		
	MEAN	**RANGE**	**CONST.**
SHRUBS			
WILLOW SPP. *(Salix spp.)*	24	0-55	93
BOG BIRCH *(Betula glandulosa)*	15	0-55	71
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	7	0-20	79
FORBS			
ALPINE BISTORT *(Polygonum viviparum)*	1	0-5	64
BEARBERRY *(Arctostaphylos uva-ursi)*	3	0-15	50
SMOOTH LEAVED CINQUEFOIL *(Potentilla diversitolia)*	1	0-10	29
ALPINE HEDYSARUM *(Hedysarum alpinum)*	3	0-15	71
STRAWBERRY *(Fragaria virginiana)*	3	0-15	71
GRASSES			
BOG SEDGE *(Kobresia myosuroides)*	26	7-45	100
SEDGE *(Carex spp.)*	3	0-4	71
TUFTED HAIRGRASS *(Deschampsia cespitosum)*	2	0-10	29
CALIFORNIA OATGRASS *(Danthonia californica)*	2	0-10	21

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1901(1700-2280) M

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
2.5(40.0-2.0)HA/AUM
.16(.01-0.2) AUM/AC

SACMB5. Bog birch/Juniper

(Betula glandulosa/Juniperus communis)

n=5 This community type is found on rocky exposures with westerly aspects in association with Engelmann spruce and lodgepole pine forests. The soils are very shallow and rapidly drained.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BOG BIRCH			
(Betula glandulosa)	29	20-80	100
COMMON JUNIPER			
(Juniperus communis)	8	0-20	80
FORBS			
YARROW			
(Achillea millefolium)	1	0-2	20
FIREWEED			
(Epilobium angustifolium)	2	1-2	100
TALL LARKSPUR			
(Delphinium glaucum)	T	0-1	17
MOUNTAIN SAGE			
(Artemisia norvegica)	1	1-2	100
TWINFLOWER			
(Linnaea borealis)	1	0-3	20
BEARBERRY			
(Arctostaphylos uva-ursi)	1	0-4	20
GRASSES			
ROCKY MOUNTAIN FESCUE			
(Festuca brachyphylla)	T	0-1	20
SEDGE			
(Carex spp.)	2	0-3	80
HAIRY WILDRYE			
(Elymus innovatus)	4	0-15	40

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1998(1900-2130) M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
35(10-50)%

ASPECT:
WESTERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-4.0) HA/AUM
.01(.01-0.1) AUM/AC

SACMB6. Willow/Forb

(Salix spp./Trollius albiflorus, Erigeron peregrinus, Mountain heliotrope)

n=6 This community type results from the invasion of willow onto the forb dominated meadows (SACMA2) previously described. These meadows occupy mesic to subhygric, gently sloping, upper subalpine to alpine areas. The soils are imperfectly to well drained Gleysols on fluvial and morainal landforms (Corns and Achuff 1982). On the poorly to imperfectly drained sites in areas where snow melts late and seepage is received throughout the growing season mountain marigold and globeflower predominate. In contrast on better drained, drier sites wandering daisy and mountain heliotrope predominate.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BARRET'S WILLOW .			
(Salix barrattiana)	40	10-75	100
SMOOTH WILLOW			
(*Salix glauca*)	17	0-40	67
BOG BIRCH			
(*Betula glandulosa*)	2	0-5	33
FORBS			
GLOBEFLOWER			
(Trollius albiflorus)	8	2-15	100
WANDERING DAISY			
(Erigeron peregrinus)	4	0-10	83
MOUNTAIN SAGE			
(Artemisia norvegica)	6	0-15	50
MOUNTAIN HELIOTROPE			
(Valeriana sitchensis)	4	0-15	50
SMOOTH LEAVED CINQUEFOIL			
(*Potentilla diversifolia*)	4	0-10	50
MOUNTAIN MARIGOLD			
(*Caltha leptosepala*)	2	0-2	33
GRASSES			
ALPINE TIMOTHY			
(Phleum commutatum)	1	0-1	67
SEDGE			
(Carex spp.)	10	0-50	83
SIMPLE BOG SEDGE			
(Kobresia simpliciuscula)	13	0-80	17

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
2103(1960-2320) M

SOIL DRAINAGE:
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-1.1) HA/AUM
.01(.01-.36) AUM/AC

SACMB7. Grouseberry-Juniper

(Vaccinium scoparium-Juniperus communis)

n=4 This is a timberline community type found in conjunction with small patches of subalpine fir. Ogilvie (1969) described a heath-grouseberry community occurring among tree islands and krummholz colonies, on lee slopes with very deep snow accumulation.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
SUBALPINE FIR (*Abies lasiocarpa*)	1	0-4	25
SHRUBS			
SMOOTH WILLOW (*Salix glauca*)	1	0-2	50
GROUSEBERRY (*Vaccinium scoparium*)	14	7-20	100
GROUND JUNIPER (*Juniperus communis*)	5	0-12	100
CROWBERRY (*Emptrum nigrum*)	2	0-8	25
FORBS			
FIREWEED *(Epilobium angustifolium)*	12	5-20	100
SMALL LEAVED EVERLASTING *(Antennaria parviflora)*	3	1-8	100
STRAWBERRY *(Fragaria virginiana)*	3	1-5	100
YARROW *(Achillea millefolium)*	2	0-2	100
GRASSES			
SPIKED TRISETUM *(Trisetum spicatum)*	7	1-20	100
SEDGE *(Carex spp.)*	1	0-3	75
CALIFORNIA OATGRASS *(Danthonia californica)*	6	0-15	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC-MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
2157(2080-2260) M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-4.5)HA/AUM
.01(.01-.09) AUM/AC

SACMB8. Subalpine fir

(Abies lasiocarpa)

n=22 This is a timberline community type found in conjunction with small patches of the grouseberry-juniper community type. The trees tend to be very small and shrub like. Ogilvie (1969) described timberline as a gradual breaking -up of the forest into groves, tree islands, low stunted krummholz colonies, and finally dwarfed isolated trees. Ogilvie found timberline to occur high on lee slopes and low on wind-exposed slopes, south facing slopes, avalanche slopes, along stream bottoms and on unstable substrata such as scree and rubble. The major environmental factors controlling timberline are low temperature, wind dessication, avalanching and snow depth.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
SUBALPINE FIR (*Abies lasiocarpa*)	29	0-20	39
SHRUBS			
SMOOTH WILLOW (*Salix glauca*)	1	0-10	22
GROUSEBERRY (*Vaccinium scoparium*)	4	0-15	22
WHITE FLOWERED RHODODENDRON (*Rhododendron albiflorum*)	4	0-30	22
GROUND JUNIPER (*Juniperus communis*)	2	0-15	44
FORBS			
FIREWEED *(Epilobium angustifolium)*	2	0-10	61
MOUNTAIN SAGE *(Artemisia norvegica)*	3	0-10	61
STRAWBERRY *(Fragaria virginiana)*	1	0-5	48
WANDERING DAISY *(Erigeron peregrinus)*	2	0-13	52
GRASSES			
SPIKED TRISETUM *(Trisetum spicatum)*	T	0-5	22
SEDGE *(Carex spp.)*	2	0-20	63
HAIRY WILDRYE *(Elymus innovatus)*	2	0-20	30

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1945(1610-2340) M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-5.0) HA/AUM
.01(.01-.08) AUM/AC

SUBALPINE SUBREGION

SOUTHERN ROCKY MOUNTAINS

NATIVE GRASSLANDS AND SHRUBLANDS

Figure 6. This figure is typical of Rough fescue-Sedge community on mesic sites in the Southern Rocky Mountains of the Subalpine subregion. On steeper slopes rough fescue and hairy wildrye predominate.

Native grass and shrubland ecology of the Southern Rocky Mountains

The ecosites and ecosite phases of the native grass and shrubland community types in the Southern Rocky Mountains of the Subalpine subregion (Table 4) are found in the valley bottoms adjacent to streams and rivers and on south facing slopes. This also includes an area that was classified as Montane, west of Turner Valley. The grass and shrublands within this area more closely resemble the subalpine than the Montane.

The grassland and shrubland community types in this ecodistrict are strongly influenced by the lower Montane subregion. Many of the grass species associated with the Montane (rough fescue, Parry oatgrass, Idaho fescue) are associated with the grassland community types described in this ecodistrict. On the wet, imperfectly drained lower slope positions the grass and shrubland communities are very similar to the water sedge and willow/water sedge communities described in the northern ecodistricts. It is the grasslands of the south facing slopes that are different between the southern and northern ecodistricts. In the northern ecodistricts the grasslands of south facing slopes are dominated by hairy wildrye, junegrass and shrubby cinquefoil. In contrast, the grasslands of the southern ecodistrict are dominated by rough fescue, bearberry, hairy wildrye and sedge species.

On gentler south-facing slopes at lower elevations rough fescue and sedge dominate the grassland community types. On more mesic sites within this community Richardson needlegrass may become co-dominant with rough fescue. In contrast at higher elevations on steeper slopes hairy wildrye replaces sedge and Richardson needlegrass as the co-dominant species.

At higher elevations just north of Waterton Lakes National Park the windswept ridges are dominated by Idaho fescue-Junegrass, Bearberry and White mountain avens to form the Fescue-Junegrass/Bearberry and White mountain avens community types. These community types are important wintering areas for bighorn sheep.

Many of these subalpine grass and shrublands are very fragile because of exposure and cold climate. The forage productivity is generally only half of what is found in the lower Montane subregion and recovery from overgrazing will likely take some time because of the poor growing conditions. Grazing pressure causes rough fescue to decline and allows sedge and hairy wildrye to dominate the community. On moist sites heavy grazing pressure allows Kentucky bluegrass to invade.

The carrying capacity, moisture and nutrient regime of the grass and shrubland communities found in the Southern Rocky Mountains of the Subalpine subregion are outlined in Table 5.

Table 4. Ecological site, ecological site phases and community types for the Subalpine subregion in Southwestern Alberta (adapted from Archibald et al 1996)(reference range plant communities are described in this guide, forested plant communities are outlined in guide to Ecosites of Southwestern Alberta)

Ecological Site	Ecological Site Phase	Forested Plant Community Type	Reference Range Plant Community Type	Successional Community Types
a lichen (xeric/poor)	a1 lichen Pl	a1.1 Pl/juniper/lichen	SASME1 Pl/Juniper	
	a2 grassland		SASMA13 Fescue-Junegrass/ Early yellow locoweed SASMA14 White Mtn. avens SASMA17 Bluebunch wheatgrass-Sedge	
b bearberry/hairy wild rye (submesic/medium)	b1 bearberry/hairy wild rye Pl	b1.1 Pl/bearberry/hairy wild rye		
	b2 grassland		SASMA2 Rough fescue-Sedge SASMA3 Rough fescue-Hairy wildrye-Sedge SASMA6 Yellow mtn. Avens SASMA9 Rough fescue-Sedge/Bearberry SASMA10 Parry oatgrass-Rough fescue-Sedge SASMA3a Hairy wildrye-R.fescue-Sedge	SASMA4 Sedge-Hairy wildrye-Slender wheatgrass SASMA11 Sedge/Bearberry SASMC2 Parry oatgrass-Kentucky bluegrass-Sedge SASMC4 Fringed sage/Kentucky bluegrass-Parry oatgrass SASMC9 Idaho fescue-Rough fescue/Bearberry SASMC11Idaho fescue-Sheep fescue-bluegrass
	b3 shrubland		SASMB2 Willow/Richardson needlegrass SASMB7 Smooth willow-Juniper/ Hairy wildrye	

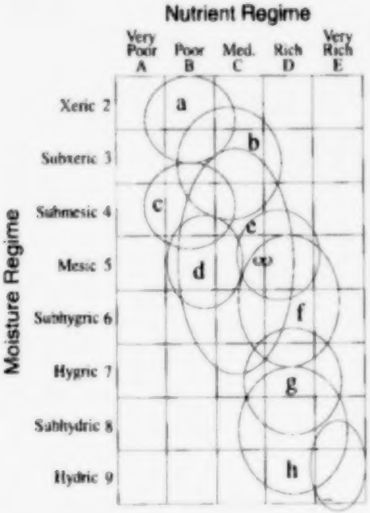
	b4 bearberry-Aw		SASMD10 Aw/Bearberry-Juniper	
c subalpine larch/heather (submesic/poor)	c1 subalpine larch/heather La-Fa	c1.1 La-Fa/heather-grouse-berry		
	c2 yellow mountain avens		SASMA6 Yellow mountain avens	
cc rough fescue (mesic/rich)	cc1 rough fescue		SASMA8 Rough fescue-Idaho fescue-Parry oatgrass SASMA2a Rough fescue-Richardson needlegrass	SASMA5 Kentucky bluegrass/Dandelion SASMC1 Parry oatgrass-Rough fescue-Kentucky bluegrass SASMC3 Meadow foxtail-Kentucky bluegrass SASMC5 Rough fescue-Kentucky bluegrass SASMC6 Kentucky bluegrass-Rough fescue SASMC7 Timothy-Slender wheatgrass/Fireweed
	cc2 shrubland		SASMA12 Silverberry-Rose SASMB6 Smooth willow-Shrubby cinquefoil/Hairy wildrye	
	cc3 forb meadow		SASMA16 Forb meadow	
d spruce/heather (mesic/poor)	d1 spruce/heather Se	d1.1 Se/heather		
e false azalea-grouse-berry (mesic/medium)	e1 false azalea-grouse-berry Pl	e1.1 Pl/green alder/arnica		
		e1.2 Pl/grouse-berry/feather moss		
		e1.3 Pl/low bilberry		

		e1.4 P1/false azalea/feather moss	SASME3 Pl-Se/Moss	
		e1.5 P1/pine grass	SASME2 Pl/Pinegrass	
		e1.6 P1/Canada buffalo-berry		
	e2 false azalea-grouse-berry Pw	e2.1 Pw/false azalea	SASMB3 Whitebark pine	
	e3 false azalea-grouse-berry Se	e3.1 Se/grouse-berry/feather moss		
		e3.2 Se/low bilberry/feather moss		
		e3.3 Se/green alder/feather moss	SASME4 Sw-Aw/Alder/Hairy wildrye	
		e3.4 Se/false azalea/feather moss		
		e3.5 Se/Canada buffalo-berry/feather moss		
		e3.6 Se/stair-step moss		SASMF1 Pinegrass/Fireweed/Sw
		e3.7 Se/wiry fern moss		
	e4 false azalea-grouse-berry Fa	e4.1 Fa/grouse-berry/feather moss		
		e4.2 Fa/false azalea/feather moss		
	e5 deciduous		SASMD1 Pb/Silverberry	

			SASMD2 Aw/Rose/Pinegrass SASMD9 Aw/Rose/Marsh reedgrass	SASMD3 Aw/Fireweed/ Meadow foxtail SASMD4 Aw/Rose/ Canada bluegrass SASMD8 Aw/K. bluegrass/Clover
	e6 grassland		SASMA15 Pinegrass-Hairy wildrye/Strawberry	SASMC11Creeping red fescue/Clover SASMC12 Rose/Pinegrass
	e7 shrubland		SASMB9 Bebb willow/Pinegrass	
f thimbleberry (subhygric/rich)	f1 thimbleberry P1	f1.1 P1/thimbleberry		
	f2 thimbleberry Fa-Se	f2.1 Fa-Se/Thimbleberry		
	f3 thimbleberry Aw-Pb		SASMD5 Aw-Pb/Cow parsnip SASMD7 Pb/Willow/Marsh reedgrass	SASMD6 Aw-Pb/Cow parsnip/Timothy
	f4 shrubby seepages		SASMA7a Marsh reedgrass/Cow parsnip	SASMC8 Marsh reedgrass-Timothy/Cow parsnip
g dwarf birch/tufted hair grass (hygric/rich)	g1 dwarf birch/tufted hair grass	g1.1 dwarf birch/tufted hair grass	SASMA7 Tufted hairgrass-Sedge SASMA1a Beaked sedge-Alpine foxtail-Tufted hairgrass	SASMB4 Willow-Bog birch/R. fescue- Kentucky bluegrass SASMA5 Kentucky bluegrass/Dandelion SASMB8 Willow/Tufted hairgrass-K. bluegrass SASMC10 Tufted hairgrass-K. bluegrass
h horsetail (subhydric/rich)	h1 horsetail Se	h1.1 Se/horsetail/feather moss		
	h2 horsetail fen	h2.1 dwarf birch/sedge/golden moss		

i fen (subhydric/rich)	i1 shrub fen		SASMB1 Willow/Sedge SASMB5 Willow/Marsh reedgrass	
	i2 graminoid fen		SASMA1 Water sedge	
	i3 treed fen		SASME5 Sw/Willow-Labrador tea	

Edatopic grid for the ecological sites in the Southern ecodistricts of the Subalpine


Nutrient Regime
Very Poor A
Poor B
Med. C
Rich D
Very Rich E
Moisture Regime
Xeric 2
Subxeric 3
Submesic 4
Mesic 5
Subhygric 6
Hygric 7
Subhydric 8
Hydric 9
a
b
c
e
ee
d
f
g
h

Ecological Sites

a lichen
(xeric/poor)
b bearberry/hairy wildrye
(submesic/medium)
c subalpine larch/heather
(submesic/poor)
ee rough fescue
(mesic/rich)
d spruce/heather
(mesic/poor)
e false azalea-grouseberry
(mesic/medium)
f thimbleberry
(subhygric/rich)
g dwarf birch tufted hairgrass
(hygric/rich)
h horsetail
(subhydric/rich)
i fen
(hydric/rich)

a2 grassland (n=30)

CHARACTERISTIC SPECIES

Shrubs

[2] Shrubby cinquefoil

Forbs

[15] White mtn. avens
[1] Bearberry
[1] False dandelion
[2] Spotted saxifrage
[1] Sandwort
[1] Kittentail
[2] Early yellow locoweed

Graminoids

[3] Sedge
[1] Junegrass
[3] Idaho fescue
[1] Rough fescue

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic
Nutrient regime: poor, very poor
Topographic position: upper slope, crest
Slope: (6-40)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: not available
Surface texture: SL,S,L
Effective texture: SL,LS
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: M,C/X
Soil subgroup:, O.R, non-soil

COMMUNITY TYPES

SASMA13 Fescue-Junegrass/Early yellow locoweed(n=17)
SASMA14 White mtn. avens(n=12)
SASMA17 Bluebunch wheatgrass-Sedge(n=1)

b2 grassland (n=56)

CHARACTERISTIC SPECIES

Shrubs

[8]	Shrubby cinquefoil

Forbs

[4]	Yellow beardtongue
[17]	Bearberry
[2]	Yellow hedysarum
[2]	Brown bracted everlasting
[2]	Yarrow
[1]	Kittentail
[2]	Strawberry

Graminoids

[9]	Sedge
[1]	Junegrass
[2]	Idaho fescue
[20]	Rough fescue
[9]	Parry oatgrass
[2]	Richardson needlegrass

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic, mesic
Nutrient regime: medium
Topographic position: upper slope, crest
Slope: (0-50)
Aspect: south, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-10)
Humus form: mull
Surface texture: SL, LS
Effective texture: SL,LS
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: M,C, GF
Soil subgroup:, O.R, O.EB, O.MB

COMMUNITY TYPES

SASMA2 Rough fescue-Sedge(n=18)
SASMA3 Rough fescue-Hairy wildrye-Sedge(n=10)
SASMA3a Hairy wildrye-Rough fescue-Sedge(n=1)
SASMA6 Yellow mtn. Avens (n=1)
SASMA9 Rough fescue-Sedge/Bearberry(n=14)
SASMA10 Parry oatgrass-Rough fescue-Sedge(n=12)

b2a grazed grassland (n=34)

CHARACTERISTIC SPECIES

Shrubs

[4]	Shrubby cinquefoil
[1]	Saskatoon
[1]	Juniper

Forbs

[6]	Old man's whiskers
[8]	Bearberry
[2]	Yellow hedysarum
[1]	Brown bracted everlasting
[4]	Yarrow
[1]	Sandwort
[2]	Strawberry

Graminoids

[9]	Sedge
[1]	Junegrass
[2]	Idaho fescue
[5]	Rough fescue
[4]	Parry oatgrass
[3]	Kentucky bluegrass
[1]	Timothy

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic, mesic
Nutrient regime: medium
Topographic position: upper slope, crest
Slope: (0-50)
Aspect: south, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-10)
Humus form: mull
Surface texture: SL, LS
Effective texture: SL,LS
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: M,C, GF
Soil subgroup:, O.R, O.EB, O.MB

COMMUNITY TYPES

SASMA4 Sedge-Hairy wildrye-Slender wheatgrass(n=15)
SASMA11 Sedge/Bearberry(n=11)
SASMC2 Parry oatgrass-Kentucky bluegrass-Sedge(n=4)
SASMC4 Fringed sage/Kentucky bluegrass-Parry oatgrass(n=1)
SASMC9 Idaho fescue-Rough fescue/Bearberry (n=2)
SASMC13 Idaho fescue-Sheep fescue-bluegrass (n=1)

b3 shrubland (n=4)

CHARACTERISTIC SPECIES

Shrubs

[30]	Willow
[5]	Bog birch
[5]	Shrubby cinquefoil

Forbs

[1]	Northern valerian
[1]	Yarrow
[1]	Fireweed
[2]	Strawberry

Graminoids

[3]	Sedge
[8]	Rocky mtn. fescue
[45]	Richardson needlegrass
[1]	Slender wheatgrass

SITE CHARACTERISTICS

Moisture regime: submesic, mesic
Nutrient regime: medium
Topographic position: lower slope
Slope: (0-5)
Aspect: south, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-10)
Humus form: mull
Surface texture: SL, LS
Effective texture: SL,LS
Depth to Mottles/Gley: none
Drainage: well
Parent material: F, GF, C
Soil subgroup:, O.R, O.EB

COMMUNITY TYPES

SASMB2 Willow/Richardson needlegrass(n=2)
SASMB7 Smooth willow-Juniper/Hairy wildrye(n=2)

b4 bearberry - Aw (n=1

CHARACTERISTIC SPECIES

Trees
[8] Aspen
[5] Lodgepole pine

Shrubs
[8] Buffaloberry
[5] Juniper

Forbs
[40] Bearberry
[1] Yellow hedysarum
[5] Small leaved everlasting
[6] Early yellow locoweed

Graminoids
[5] Sedge
[2] Rocky mtn. fescue
[7] Junegrass
[6] Slender wheatgrass

SITE CHARACTERISTICS

Moisture regime: submesic, mesic
Nutrient regime: medium
Topographic position: lower slope
Slope: (0-5)
Aspect: south, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-10)
Humus form: mull
Surface texture: SL, LS
Effective texture: SL,LS
Depth to Mottles/Gley: none
Drainage: well
Parent material: F, GF, C

Soil subgroup:, O.R, O.EB

COMMUNITY TYPES

SASMD10 Aw/Bearberry-Juniper(n=1)

c2 yellow mtn. avens (n=1)

CHARACTERISTIC SPECIES

Shrubs
[4] Shrubby cinquefoil

Forbs
[13] Yellow mtn. avens
[5] Late yellow locoweed
[3] Silvery cinquefoil
[3] Low goldenrod
[3] Yellow hedysarum

Graminoids
[67] Sedge
[6] Hairy wildrye
[5] Fringed brome
[1] Slender wheatgrass

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic
Nutrient regime: poor, medium
Topographic position: floodplain
Slope: (0-5)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mor
Surface texture: SL,SiL
Effective texture: SL,
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: F,GF
Soil subgroup:, O.R

COMMUNITY TYPES

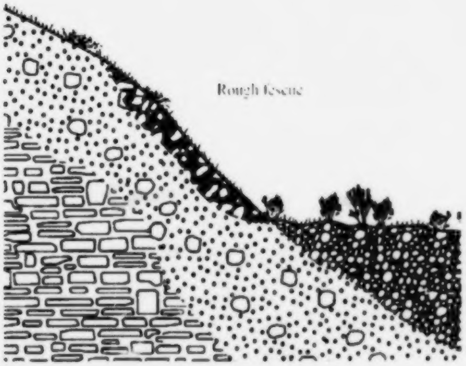
SASMA6 Yellow mtn. avens (n=1)

cc **rough fescue** (n=65)

mesic/rich

GENERAL DESCRIPTION

This ecosite is typical of south and west facing slopes and lower slope positions throughout the southern mountains of the Subalpine subregion from an elevation of 1500 m to 1900 m. This ecosite is usually dominated by grass species because of the dry site conditions and westerly winds. The soils of this ecosite are dominated by deep black soils. A number of rough fescue dominated sites have not had the species composition change in over 30 years of no disturbance in the Montane subregion indicating the climax nature of this ecosite.



SUCCESSIONAL RELATIONSHIPS

Due to the nature of the site grasslands often remain the climax vegetation on these sites. On moister sites shrubs and trees such as saskatoon, snowberry, chokecherry and aspen often invade the site. Heavy grazing pressure on these grasslands can often lead to a degraded site that is dominated by Kentucky bluegrass, timothy and clover species.

INDICATOR SPECIES

rough fescue
Parry oatgrass
Idaho fescue
Old man's whiskers
Silverberry
Kentucky bluegrass
Timothy
Dandelion
Cut leaved anemone
Rose

SITE CHARACTERISTICS

Moisture regime: submesic, mesic
Nutrient regime: rich, medium
Topographic position: crest, midslope, lower slope
Slope: (0-2%)^{5}(16-30%)^{3} (31-45%)^{1}(45-70%)^{1}
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mull
Surface texture: CL,SiL, L
Effective texture: CL, SiL, SL,
Depth to Mottles/Gley: none
Drainage: well
Parent material: F, GF, M
Soil subgroup: O.BL, O.DG, O.MB

ECOSITE PHASES

cc1 rough fescue (n=10)
cc1a grazed rough fescue(n=53)
cc2 shrubland(n=2)

cc1 rough fescue (n=10)

CHARACTERISTIC SPECIES

Shrubs
[6] Shrubby cinquefoil
[4] Rose
[3] Saskatoon

Forbs
[15] Showy aster
[10] Strawberry
[7] Sticky purple geranium
[1] White mtn. avens
[3] Northern bedstraw

Graminoids
[23] Rough fescue
[10] Idaho fescue
[4] Parry oatgrass
[3] Sedge

SITE CHARACTERISTICS

Moisture regime: submesic, mesic
Nutrient regime: rich, medium
Topographic position: crest, midslope, lower slope
Slope: (0-2%)^5(16-30%)^3 (31-45%)^1(45-70%)^1
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mull
Surface texture: CL,SiL, L
Effective texture: CL, SiL, SL,
Depth to Mottles/Gley: none
Drainage: well
Parent material: F, GF, M
Soil subgroup: O.BL, O.DG, O.MB

COMMUNITY TYPES

SASMA8 Rough fescue-Idaho fescue-Parry oatgrass(n=4)
SASMA2a Rough fescue-Richardson needlegrass(n=6)

cc1a grazed rough fescue (n=53)

CHARACTERISTIC SPECIES

Shrubs

[4]	Shrubby cinquefoil
[2]	Rose
[1]	Saskatoon

Forbs

[4]	Dandelion
[1]	Strawberry
[2]	Old man's whiskers
[2]	Yarrow
[2]	Clover
[3]	Graceful cinquefoil

Graminoids

[8]	Rough fescue
[1]	Idaho fescue
[2]	Parry oatgrass
[1]	Sedge
[15]	Kentucky bluegrass
[8]	Timothy

SITE CHARACTERISTICS

Moisture regime: submesic, mesic
Nutrient regime: rich, medium
Topographic position: crest, midslope, lower slope
Slope: (0-2%)^5(16-30%)^3 (31-45%)^1(45-70%)^1
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mull
Surface texture: CL,SiL, L
Effective texture: CL, SiL, SL,
Depth to Mottles/Gley: none
Drainage: well
Parent material: F, GF, M
Soil subgroup: O.BL, O.DG, O.MB

COMMUNITY TYPES

SASMA5 Kentucky bluegrass/Dandelion(n=14)
SASMC1 Parry oatgrass-Rough fescue-Kentucky bluegrass(n=8)
SASMC3 Meadow foxtail-Kentucky bluegrass(n=3)
SASMC5 Rough fescue-Kentucky bluegrass(n=3)
SASMC6 Kentucky bluegrass-Rough fescue(n=17)
SASMC7 Timothy-Slender wheatgrass/Fireweed(n=8)

cc2 shrubland (n=2)

CHARACTERISTIC SPECIES

Trees

[8]	Aspen

Shrubs

[15]	Silverberry
[5]	Rose

Forbs

[6]	Chickweed
[2]	False dandelion
[1]	Silver plant

Graminoids

[1]	Rocky mtn. fescue
[9]	Bluebunch wheatgrass

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: rich
Topographic position: crest, midslope
Slope: (16-30%)
Aspect: south

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mull
Surface texture: CL,SiL, L
Effective texture: CL, SiL, SL,
Depth to Mottles/Gley: none
Drainage: well
Parent material: F, GF, M
Soil subgroup: O.BL, O.DG, O.MB

COMMUNITY TYPES

SASMA15 Silverberry-Rose (n=1)
SASMB6 Smooth willow-Shrubby cinquefoil/Hairy wildrye(n=1)

cc3 Forb meadow (n=1)

CHARACTERISTIC SPECIES

Shrubs

[3]	Shrubby cinquefoil
[2]	Rose

Forbs

[3]	Graceful cinquefoil
[4]	Yellow hedysarum
[2]	American vetch
[6]	Fireweed
[1]	Strawberry

Graminoids

[2]	Parry oatgrass
[3]	Hairy wildrye
[2]	Rough fescue

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: rich, medium
Topographic position: lower slope
Slope: (0-8%)
Aspect: south, level

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: moder
Surface texture: SL,SiL, L,C
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well
Parent material: F, C, M, X
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

SASMA16 Forb meadow(n=1)

e5 deciduous (n=23)

CHARACTERISTIC SPECIES

Trees

[20] Aspen
[10] Balsam poplar

Shrubs

[2] Silverberry
[7] Rose
[3] White meadowsweet

Forbs

[5] American vetch
[6] Yellow peavine
[4] Strawberry
[4] Fireweed
[4] Showy aster
[1] Alpine hedysarum

Graminoids

[14] Pinegrass
[6] Hairy wildrye
[1] Junegrass

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: midslope, lower slope, floodplain
Slope: (0-5%)
Aspect: south, level

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mor
Surface texture: SL,SiL, L
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none
Drainage: well, mod. well
Parent material: F, C, M
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

SASMD1 Pb/Silver berry(n=1)
SASMD2 Aw/Rose/Pinegrass(n=22)

e5a grazed deciduous (n=2)

CHARACTERISTIC SPECIES

Trees

[35] Aspen
[3] White spruce

Shrubs

[5] Gooseberry
[6] Rose

Forbs

[1] American vetch
[3] Yellow peavine
[3] Strawberry
[6] Fireweed
[13] Lindley aster
[2] Dandelion

Graminoids

[4] Pinegrass
[2] Kentucky bluegrass
[18] Canada bluegrass
[16] Meadow foxtail
[9] Orchardgrass
[3] Timothy

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: midslope, lower slope
Slope: (0-5%)
Aspect: south, level

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mor
Surface texture: SL,SiL, L
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none
Drainage: well, mod. well
Parent material: F, C, M
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

SASMD3 Aw/Fireweed/Meadow foxtail(n=1)
SASMD4 Aw/Rose/Canada bluegrass(n=1)

e6 grassland (n=4)

CHARACTERISTIC SPECIES

Shrubs
[1] Shrubby cinquefoil
[9] Rose
Forbs
[4] Lupine
[2] Yellow peavine
[3] Dandelion
[1] Graceful cinquefoil
[3] Showy aster
[1] False mtn. dandelion
Graminoids
[11] Pinegrass
[2] Junegrass
[4] Hairy wildrye
[3] Kentucky bluegrass

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: crest, midslope, lower slope
Slope: (16-30%)
Aspect: southerly

SOIL CHARACTERISTICS

Organic thickness: (0-2)(2-5)
Humus form: mull
Surface texture: CL,SiL, L
Effective texture: CL, SiL, SL,
Depth to Mottles/Gley: none
Drainage: well, rapid
Parent material: C, M
Soil subgroup: O.EB, O.MB, O.DG

COMMUNITY TYPES

SASMA15 Pinegrass-Hairy wildrye/Strawberry(n=4)

e7 shrubland (n=1)

CHARACTERISTIC SPECIES

Trees
[20] Lodgepole pine
[10] White spruce
Shrubs
[51] Willow
[2] Rose
[3] Bracted honeysuckle
Forbs
[15] Scouring rush
[14] Lindley's aster
[9] Fireweed
[6] Strawberry
Graminoids
[5] Pinegrass
[5] Beaked sedge
[4] Tufted hairgrass

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: lower slope
Slope: 0-5%
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: 0-25
Humus form: mull
Surface texture: CL,SiL, L
Effective texture: CL, SiL, SL,
Depth to Mottles/Gley: none
Drainage: well,moderately well
Parent material: C, M
Soil subgroup: O.HG

COMMUNITY TYPES

SASMB9 Bebb willow/Pinegrass(n=1)

f3 thimbleberry Aw-Pb (n=4)

CHARACTERISTIC SPECIES

Trees
[30] Aspen
[10] Balsam poplar
Shrubs
[6] Gooseberry
[1] Rose
Forbs
[48] Cow parsnip
[2] Yellow peavine
[15] Canada violet
[6] Fireweed
[22] Lindley aster
[12] Tall lungwort
[12] Tall larkspur
Graminoids
[1] Marsh reedgrass
[2] Hairy wildrye
[2] Sedge

SITE CHARACTERISTICS

Moisture regime: subhygric
Nutrient regime: rich
Topographic position: lower slope
Slope: (0-8%)
Aspect: south, level

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: moder
Surface texture: SL,SiL, L,C
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well
Parent material: F, C, M, X
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

SASMD5 Aw-Pb/Cow parsnip(n=3)
SASMD7 Aw-Pb/Willow/Marsh reedgrass(n=1)

f3a grazed thimbleberry Aw (n=1)

CHARACTERISTIC SPECIES

Trees
[26] Aspen
[16] Balsam poplar
Shrubs
[4] Raspberry
[1] Rose
Forbs
[2] Cow parsnip
[2] Yellow peavine
[2] Canada violet
[6] Fireweed
[19] Lindley aster
[12] White geranium
[6] Dandelion
Graminoids
[4] Marsh reedgrass
[18] Timothy
[4] Kentucky bluegrass
[7] Smooth wildrye

SITE CHARACTERISTICS

Moisture regime: subhygric
Nutrient regime: rich
Topographic position: lower slope, midslope
Slope: (0-8%)
Aspect: south, level, north

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: moder
Surface texture: SL,SiL, L,C
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well
Parent material: F, C, M, X
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

SASMD6 Aw-Pb/Cow parsnip/Timothy(n=1)

f4 shrubby seepage (n=1)

CHARACTERISTIC SPECIES

Shrubs

[1]	Raspberry
[4]	Rose
Forbs	
[3]	Cow parsnip
[10]	Western meadow rue
[4]	Canada violet
[25]	Fireweed
[4]	Horsetail
[4]	Sticky purple geranium
[1]	Dandelion
Graminoids	
[24]	Marsh reedgrass
[15]	Sedge
[5]	Idaho fescue
[2]	Brome

SITE CHARACTERISTICS

Moisture regime: subhygric
Nutrient regime: rich
Topographic position: lower slope, midslope
Slope: (0-8%)
Aspect: south, level, north

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: moder
Surface texture: SL,SiL, L,C
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well
Parent material: F, C, M, X
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

SASMA7a Marsh reedgrass/Cow parsnip/(n=1)

f4a grazed shrubby seepage (n=1)

CHARACTERISTIC SPECIES

Shrubs

[6] Raspberry

Forbs

[28] Cow parsnip
[15] Western meadow rue
[20] Canada violet
[3] Fireweed
[1] Horsetail
[10] White geranium
[3] Dandelion

Graminoids

[37] Marsh reedgrass
[1] Sedge
[29] Timothy
[2] Mountain brome

SITE CHARACTERISTICS

Moisture regime: subhygric
Nutrient regime: rich
Topographic position: lower slope, midslope
Slope: (0-8%)
Aspect: south, level, north

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: moder
Surface texture: SL,SiL, L,C
Effective texture: CL, SiL, SCL,
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well
Parent material: F, C, M, X
Soil subgroup: O.EB, E.DYB, O.EB, BR.GL

COMMUNITY TYPES

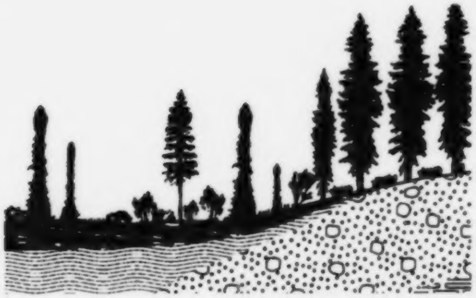
SASMC8 Marsh reedgrass-Timothy/Cow parsnip/(n=1)

i fen (n=10)(taken from Ecosites of West-Central Alberta)

subhydric/rich

GENERAL DESCRIPTION

The rich and poor fen are combined in this ecosite. The fen ecosite is generally characterized by flowing oxygenated water and alkaline, nutrient-rich conditions. This ecosite occupies level, depressional and lower slope positions where impeded drainage or high water tables enhance the accumulation of organic matter consisting of sedges, golden moss, tufted moss, and brown moss. Black and/or Engelmann spruce dominate the canopy of the treed phase, while dwarf birch or willow form the canopy of the shrubby phase and sedges dominate the graminoid phase.



SUCCESSIONAL RELATIONSHIPS

The fen is an early stage in hydarch succession. Species composition, direction, and rate of succession changes with changing hydrologic regime. As with other wetlands, rich fens have slow successional rates so recovery from disturbance may also be slow.

INDICATOR SPECIES

Black spruce
Engelmann spruce
Willow
Labrador tea
Dwarf birch
Horsetail
Sedge
Golden moss
Brown moss
Tufted moss

SITE CHARACTERISTICS

Moisture regime: subhygric, hygric, subhydric,hydric
Nutrient regime: rich, very rich, medium
Topographic position: level, depression, toe
Slope: level, (0-1%)
Aspect: level, southerly, easterly

SOIL CHARACTERISTICS

Organic thickness: (>80)(60-79)
Humus form: mor, peaty mor
Surface texture: fibric, mesic
Effective texture: fibric, mesic
Depth to Mottles/Gley: not applicable
Drainage: imperfect, poor, very poor
Parent material: O
Soil subgroup:R.G, TY.M, TY.F, T.M, T.F, R.HG, O.HG, O.G, FI.M

ECOSITE PHASES

i1 shrub fen (n=5)
i2 graminoid fen(n=4)
i3 treed fen (n=1)

i1 shrubby fen (n=5)

CHARACTERISTIC SPECIES

Shrub

[25]	Willow
[5]	Shrubby cinquefoil
[3]	Dwarf birch

Forb

[3]	Lindley's aster
[6]	Strawberry
[4]	Arrow leaved coltsfoot
[2]	Horsetail
[1]	Cow parsnip

Grass

[25]	Sedge
[2]	Tufted hairgrass
[6]	Baltic rush
[2]	Tufted hairgrass

SITE CHARACTERISTICS

Moisture regime: subhygric, subhydric
Nutrient regime: very rich, rich medium
Topographic position: level, depression
Slope: level, (0-2%)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (>80)(60-79)
Humus form: mor, peaty mor
Surface texture: fibric, mesic
Effective texture: fibric, mesic
Depth to Mottles/Gley: not applicable
Drainage: imperfect, poor, very poor

Parent material: O
Soil subgroup:R.G, TY.M, TY.F, T.M, T.F, R.HG, O.HG, O.G, FI.M

PLANT COMMUNITY TYPES

SASMB1 Willow/Sedge (n=3)
SASMB5 Willow/Marsh reedgrass(n=2)

i2 graminoid fen (n=4)

CHARACTERISTIC SPECIES

Shrub

[1] Willow

Forb

[1] Northern bedstraw
[1] Fireweed

Grass

[81]Water sedge
[4] Tufted hairgrass

SITE CHARACTERISTICS

Moisture regime: hygric, subhydric
Nutrient regime: very rich, rich
Topographic position: level, depression
Slope: level, (0-2%)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (>80)(60-79)
Humus form: mor, peaty mor
Surface texture: fibric, mesic
Effective texture: fibric, mesic
Depth to Mottles/Gley: not applicable
Drainage: imperfect, poor
Parent material: O
Soil subgroup:R.G, TY.M, TY.F, T.M, T.F, R.HG, O.HG, O.G, FI.M

PLANT COMMUNITY TYPES

SASMA1 Sedge meadows (n=4)

i3 treed fen (n=1)

CHARACTERISTIC SPECIES

Tree
[35] White spruce
Shrubs
[19] Willow
[20] Labrador tea
[12] Bog birch

Forbs
[12] Small bog cranberry
[6] Twinflower
[2] Mitrewort

Graminoids
[5] Sedge
[2] Baltic rush

SITE CHARACTERISTICS

Moisture regime: subhydric, hygric
Nutrient regime: rich
Topographic position: toe
Slope: level
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: 16-25
Humus form: peatmor
Surface texture: humic
Effective texture: SCL
Depth to Mottles/Gley: (0-25)
Drainage: poor
Parent material: F
Soil subgroup: O.HG

COMMUNITY TYPES

SASME5 Sw/Willow-Labrador tea (n=1)

Table 5. Native grass and shrublands organized by ecological range site for the Southern Rocky Moutains of the Subalpine subregion

Community number	Community type	Productivity (kg/ha)						Carrying
		Grass	Forb	Shrub	Total	Moisture	Drainage	capacity (ha/AUM)
a2	**grassland**	**274**	**390**	**292**	**810**	**Xeric**	**Rapidly**	**3.0**
SASMA13	Fescue-Junegrass/E.yellow locoweed	512	291	192	994	Subxeric	Very rapidly	2.0
SASMA14	White mountain avens	36	198	392	626	Very xeric	Rapidly	40.0
SASMA17	Bluebunch wheatgrass-Sedge	600	350	200	1150	Xeric	Rapidly	2.0
b2	**grassland**	**932**	**617**	**186**	**1510**	**Submesic**	**Rapidly**	**1.0**
SASMA2.	Rough fescue-Sedge	1380	676	49	1917	Mesic	Well	0.7
SASMA3.	Rough fescue-Hairy wildrye	1326	653	171	1662	Submesic	Rapidly	0.7
SASMA3a	Hairy wildrye-Rough fescue-Sedge	-	-	-	1225	Submesic	Well	0.7
SASMA6.	Yellow mountain avens	572	602	0	1372*	Mesic	Rapidly	40.0
SASMA9	Rough fescue-Sedge/Bearberry	695	285	680	1542	Subxeric	Rapidly	1.5
SASMA10	Parry oatgrass-Sedge	732	702	96	1452	Subxeric	Rapidly	0.7
b2a	**grazed grassland**	**976**	**671**	**289**	**1943**	**Submesic**	**Rapidly**	**1.0**
SASMA4.	Sedge-Hairy wildrye-Slender wheatgrass	1116	683	56	1891	Submesic	Well	0.8
SASMA11	Sedge/Bearberry	733	391	1051	2175	Xeric	Rapidly	1.7
SASMC2.	Parry oatgrass-Kentucky bluegrass-Sedge	1140	685	79	1894	Subxeric	Rapidly	0.8
SASMC4.	Fringed sage/Kentucky bluegrass-Parry oatgrass	704	490	236	1430	Xeric	Rapidly	1.0
SASMC9	Idaho fescue-Rough fescue/Bearberry	1408	862	43	2313	Submesic	Well	1.6
SASMC13	Idaho fescue-Sheep fescue-bluegrass				1500	Submesic	Well	1.0
b3	**shrubland**	**572**	**421**	**235**	**1228**	**Subxeric**	**Rapidly**	**1.5**
SASMB2.	Willow/Richardson needlegrass	-	-	-	N/A	Submesic	Well	4.0
SASMB7	Smooth willow-Juniper Hairy wildrye	572	421	235	1228	Subxeric	Rapidly	1.2

Table 5 cont'd

Community number	Community type	Productivity (kg/ha) Grass	Forb	Shrub	Total	Moisture	Drainage	Carrying capacity (ha/AUM)
cc1	**rough fescue**	**1117**	**400**	**23**	**1526**	**Mesic**	**Well**	**0.6**
SASMA2a.	Rough fescue-Richardson needlegrass	1088	186	-	1237	Mesic	Well	0.7
SASMA8	Rough fescue-Idaho fescue-Parry oatgrass	1146	614	55	1815	Submesic	Well	0.5
cc1a	**grazed rough fescue**	**2154**	**762**	**10**	**2670**	**Mesic**	**Well**	**0.7**
SASMC1.	Parry oatgrass-Rough fescue-Kentucky bluegrass	1160	712	24	1574	Xeric	Rapidly	0.6
SASMC3.	Meadow foxtail-Kentucky bluegrass Parry oatgrass	2775	507	-	3282	Mesic	Well	0.5
SASMC5.	Rough fescue-Kentucky bluegrass	-	-	-	2000*	Mesic	Well	0.6*
SASMC6.	Kentucky bluegrass-Rough fescue	1382	887	14	2258	Mesic	Rapidly	0.8
SASMC7	Timothy-K. bluegrass /Fireweed	3300	940	-	4240	Submesic	Rapidly	0.5
cc2	**shrubland**	**405**	**356**	**358**	**1369**	**Mesic**	**Well**	**1.4**
SASMA12	Sliverberry-Rose				500*	Subxeric	Rapidly	1.8
SASMB6	Smooth willow-Shrubby cinquefoil Hairy wildrye	810	712	716	2238	Mesic	Well	1.0
cc3	**forb meadow**	**554**	**734**	**125**	**1413**	**Mesic**	**Well**	**1.0**
SASMA16	Forb meadow	554	734	125	1413	Submesic	Well	0.6
e2	**false azalea-grouseberry Pw**	**-**	**-**	**-**	**N/A**	**Mesic**	**Rapidly**	**40.0**
SASMB3.	Whitebark pine	-	-	-	N/A	Submesic	Rapidly	40.0
e6	**grassland**	**1039**	**591**	**94**	**2037**	**Subxeric**	**Rapidly**	**0.8**
SASMA15	Pinegrass-Hairy wildrye/Strawberry	758	1170	110	2037	Subxeric	Rapidly	0.8

Community **Community type** **Productivity (kg/ha)** **Carrying**

number		Grass	Forb	Shrub	Total	Moisture	Drainage	capacity (ha/AUM)
SASMC11	Creeping red fescue/Clover	1916	152	52	2120	Mesic	Well	0.5
SASMC12	Rose/Pinegrass	444	452	120	1016	Mesic	Well	1.0
e7	**shrubland**	**150**	**100**	**1000**	**1250**	**Subhygric**	**Mod.Well**	**3.6**
SASMB9	Bebb willow/Pinegrass	150	100	1000	1250	Subhygric	Mod.Well	3.6
f4	**shrubby seepages**	**-**	**-**	**-**	**2000***	**Subhygric**	**Mod. Well**	**0.8**
SASMA7a	Marsh reedgrass/Cow parnsip	-	-	-	2000*	Subhygric	Mod. Well	0.8
f4a	**grazed shrubby seepage**	**4030**	**863**	**33**	**4926**	**Subhygric**	**Mod. Well**	**0.8**
SASMC8	Marsh reedgrass-Timothy/Cow parsnip	4030	863	33	4926	Subhygric	Mod. Well	0.8
g1	**dwarf birch/tufted hairgrass**	**-**	**-**	**-**	**1668**	**Hygric**	**Mod. Well**	**0.8**
SASMA1a	Awned sedge-Alpine foxtail-Tufted hairgrass				2000*	Subhygric	Mod. Well	0.7
SASMA7	Tufted hairgrass-Sedge	1164	162	0	1326	Subhygric	Mod. Well	0.8
g1a	**grazed birch/tufted hairgrass**	**1533**	**278**	**64**	**2154**	**Hygric**	**Mod. Well**	**1.0**
SASMB4	Willow-Birch/R.fescue-K.bluegrass	250	450	1004	1404	Subhygric	Mod. Well	1.1
SASMB8	Willow/Tufted hairgrass-Kentucky bluegrass	1734	248	-	1982	Subhygric	Mod.Well	1.0
SASMC10	Tufted hairgrass-Kentucky bluegrass	2792	405	-	3197	Subhygric	Mod. Well	0.9
SASMA5.	Kentucky bluegrass/Dandelion	1708	403	104	2033	Subhygric	Mod. Well	0.9
i1	**shrub fen**	**1207**	**244**	**756**	**2150**	**Subhydric**	**Poorly**	**1.0**
SASMB1.	Willow/Sedge	1513	400	236	2150	Hygric	Poorly	1.0
SASMB5	Willow/Marsh reedgrass	900	88	1276	1916	Subhygric	Imperfectly	1.0
i2	**graminoid fen**	**1636**	**109**	**0**	**1745**	**Subhydric**	**Poorly**	**0.5**
SASMA1.	Water sedge	1636	109	0	1745	Subhydric	Poorly	0.5

***Estimate**

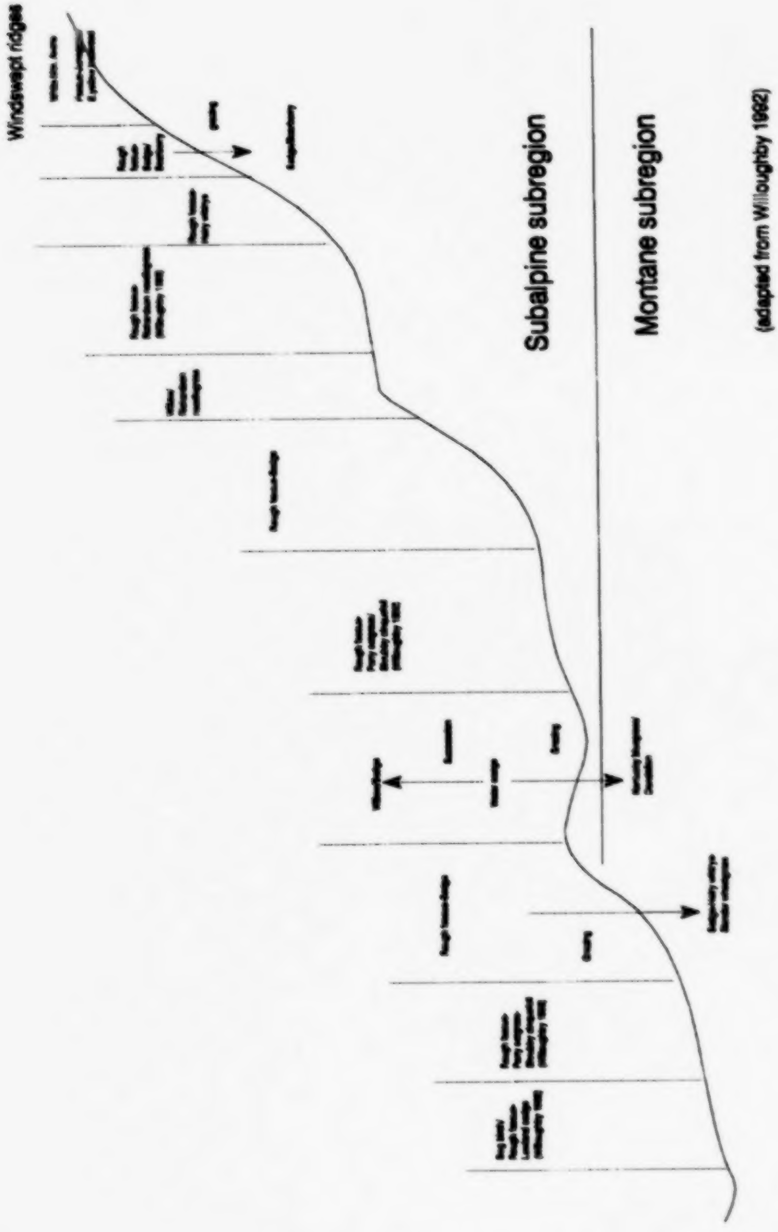

Windswept ridges
Subalpine subregion
Montane subregion
(adapted from Willoughby 1992)

Figure 7. Grassland and shrubland community types in the landscape of the Montane and Subalpine subregions of southern Alberta.

Key to grass and shrubland dominated communities in the Southern mountains of the Subalpine subregion.

1. Timberline communities or windswept ridges at timberline.......... 2

Meadow communities or south facing grasslands at lower elevations.......... 4

2. Mesic plant community dominated by Whitebark pine or willow..........2a

Windswept ridges dominated by white mtn. avens, Idaho fescue, junegrass, willow or juniper.......... 3

2a Plant community dominated by Whitebark pine..........SASMB3

Lower slope position dominated by willow with scattered trees..........SASMB6

3. Community has scattered willow and juniper and is dominated by Hairy wildrye..........3b

Community dominated by white mtn. avens, Idaho fescue or Junegrass.......... 3a

3a. Community dominated by white mtn. avens..........SASMA14

Grass dominated community dominated by Idaho fescue and Junegrass..........SASMA13

3b Smooth willow, hairy wildrye dominated site..........SASMB7

Bebb willow, pinegrass dominated site..........SASMB9

4. Moist meadows or gravelly river flats dominated by shrubs, tufted hairgrass, sedge, yellow mtn. avens or silverberry.......... 5

Drier south and north facing slopes dominated by rough fescue, parry oatgrass, upland sedges, hairy wildrye, pinegrass,bluebunch wheatgrass or forb dominated meadows with fireweed.......... 13

5. Dry gravelly river flats dominated by yellow mtn. avens , Idaho fescue or silverberry... 6

Moist sites dominated by willow, bog birch or grassy areas dominated by tufted hairgrass, sedge, marsh reedgrass, kentucky bluegrass and dandelion.......... 7

6. Site dominated by yellow mtn. avens..........SASMA6

Site dominated by silverberry or Idaho fescue and Canada bluegrass..........6a

6a. Site is a grazed grassland dominated by Idaho fescue and Canada bluegrass.......SASMC13

Site is dominated by silverberry..........SASMA12

7. Willow or bog birch dominated community types.......... 8

Grass dominated meadows (tufted hairgrass, marsh reedgrass, alpine foxtail,awned sedge, water sedge, kentucky bluegrass).......... 11

8. Wetter sites dominated by sedge,tufted hairgrass or marsh reedgrass.......... 9

Drier, sites dominated by richardson needlegrass or rough fescue in understory...... 10

9. Understory dominated by tufted hairgrass..........SASMB8

Understory dominated by marsh reedgrass or sedge species.......... 9a

9a. Understory dominated by marsh reedgrass..........SASMB5

Understory dominated by sedge..........SASMB1

10. Dry south facing slopes in Athabasca river valley near Jasper, dominated by Richardson needlegrass in understory..........SASMB2

Understory dominated by rough fescue..........SASMB4

11. Very wet sites dominated by water sedge..........SASMA1

Drier sites dominated by tufted hairgrass, graceful sedge, marsh reedgrass, alpine foxtail or Kentucky bluegrass.......... 12

12 Ungrazed sites dominated by tufted hairgrass, awned sedge, alpine foxtail, marsh reedgrass, or graceful sedge.......... 12a

Grazed sites dominated by Kentucky bluegrass, timothy or dandelion.......... 12b

12a Marsh reedgrass and cow parsnip dominated grassy meadows..........SASMA7a

Tufted hairgrass, beaked sedge, alpine foxtail or graceful sedge dominated meadow..........12c

12b Marsh reedgrass, timothy, cow parsnip dominated meadows..........SASMC8

Heavy grazing pressure site dominated by Kentucky bluegrass and dandelion.....SASMA5

12c Tufted hairgrass, graceful sedge dominated meadows..........SASMA7

Awned sedge, Alpine foxtail dominated meadow..........SASMA1a

13. Ungrazed rough fescue, hairy wildrye, bluebunch wheatgrass, pinegrass or

forb dominated grasslands.. 14
Moderately to heavily grazed grasslands 20
14. Pinegrass or forb (fireweed) dominated meadows 15
Rough fescue, bluebunch wheatgrass, parry oatgrass, hairy wildrye, bearberry dominated grasslands.. 16
15 Site dominated by forbs, moist seepage area..SASMA16
Pinegrass, hairy wildrye dominated grassland..SASMA15
16. Rough fescue or bluebunch wheatgrass dominated grasslands, south and west of Turner valley, hairy wildrye and sedge dominate or co-dominate grassland.. 17
Rough fescue dominated grasslands, west of Porcupine Hills and in Castle area, co-dominated by Parry oatgrass, sedge or bearberry.. 18
17. Grasslands of south facing slopes and benches, sedge, Richardson needlegrass co-dominated.. 17b
Grasslands of lower slope positions or north aspects, dominated or co-dominated by hairy wildrye.. 17a
17a Grassland dominated by hairy wildrye, north aspects on steep ridges................SASMA3a
Grasslands co-dominated by hairy wildrye, south facing....................................SASMA3
17b Terrace grasslands co-dominated by Richardson needlegrass...................................SASMA2a
Grasslands on slopes co-dominated by sedge or Bluebunch wheatgrass.......................17c
17c Rough fescue-Sedge dominated grassland..SASMA2
Bluebunch wheatgrass-Sedge dominated grassland...SASMA17
18. Grasslands of lower slope positions dominated by Rough fescue.............................. SASMA8
Grasslands of mid to upper slope positions dominated by Parry oatgrass, Idaho fescue or bearberry.. 19
19. Grasslands of midslope position dominated by Parry oatgrass, Idaho fescue............SASMA10
Grasslands of upper slope positions or hillcrests co-dominated by bearberry............SASMA9
20. Moderately grazed grasslands native grass species still dominate the site............ 21
Heavily grazed grasslands non-native species (Kentucky bluegrass, timothy, meadow foxtail) dominate or co-dominate the site.. 22
21 Drier sites with bearberry 21a
Moister sites dominated by sedge, hairy wildrye,tufted hairgrass or slender wheatgrass.. 21b
21a Grassy areas with a high cover of Idaho fescue and Rough fescue.............................SASMC9
Sedge dominates the grass layer..SASMA11
21b Well drained sites dominated by sedge, hairy wildrye or wheatgrass..........................SASMA4
Mod. well drained sites dominated by tufted hairgrass..SASMC10
22. Old range improvement dominated by meadow foxtail...SASMC3
Meadow foxtail not present grazed or range improvement sites.................................. 23
23 Kentucky bluegrass or timothy dominated sites.. 24
Kentucky bluegrass only co-dominate, Parry oatgrass or rough fescue or fringed sage or C. red fescue or pinegrass dominates..25
24. Timothy dominated community..SASMC7
Kentucky bluegrass, dandelion dominated..SASMC6
25. Rough fescue dominates the site.. SASMC5
Parry oatgrass, C. red fescue, pinegrass or Fringed sage dominates the site.................. 26
26. Hillcrests and south facing slopes dominated by fringed sage.......................................SASMC4
Parry oatgrass dominated community types.. 27
27. Parry oatgrass with Rough fescue and Kentucky bluegrass, lower slope.......................SASMC1
Little rough fescue present, midslope position with C. red fescue or pinegrass..............28
28. Drier sites dominated by Parry oatgrass..SASMC2
Creeping red fescue, Pinegrass or Rose dominated sites..29
29. Creeping red fescue dominated range improvement site..SASMC11
Old range improvement site dominated by rose and pinegrass.......................................SASMC12

SASMA1. Water sedge

(Carex aquatilis)

n=4 This community type is found in all ecodistricts of the subalpine. Wet conditions and periodic flooding result in the formation of water sedge meadows. Willow will invade into the drier edges of these meadows to form the Willow/Water sedge community type. These community types are quite productive producing nearly 2000 kg/ha of forage, but the high water table in the spring and summer when these meadows are most palatable limits livestock use. A study in the Yukon found that crude protein on these meadows declined from a high of 10% in May to less than 5% in September (Bailey et al. 1992). As a result, these meadows would be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW			
(Salix spp.)	T	-	25
FORBS			
FIREWEED			
(Epilobium angustifolium)	T	0-1	50
NORTHERN BEDSTRAW			
(*Galium boreale*)	1	0-5	25
GRASSES			
WATER SEDGE			
(Carex aquatilis)	74	52-93	100
TUFTED HAIRGRASS			
(Deschampsia cespitosum)	3	0-9	75

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYDRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1600-1981(1859) M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION

GRASS	1636 (636-2636)
FORB	109 (0-218)
TOTAL	1745(636-2854)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
0.5 (40.0-0.3) HA/AUM
0.81 (.01.35) AUM/AC

SASMA1a. Awned sedge-Alpine foxtail-Tufted hairgrass

(Carex atherodes-Alopecurus occidentalis-Deschampsia cespitosa)

n=1 This community type was described in a meadow adjacent to a small creek. It is similar to the previously described water sedge community, but this community type is better drained which favours the growth of awned sedge, alpine foxtail and tufted hairgrass. On the drier edges of this community type upland grass species like rough fescue and Idaho fescue can be found. Willoughby (1992) has found that beaked sedge is palatable to livestock, which causes these meadows to be regularly grazed. Heavy grazing will allow Kentucky bluegrass, timothy and dandelion to invade onto these sites.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
WILLOW *(Salix spp.)*	1	-	100
FORBS			
FIREWEED *(Epilobium angustifolium)*	3	-	100
MARSH CINQUEFOIL *(Poa palustre)*	40	-	100
SMOOTH ASTER *(Aster laevis)*	18	-	100
MOUNTAIN CINQUEFOIL *(Potentilla diversifolia)*	15	-	100
GRASSES			
AWNED SEDGE *(Carex atherodes)*	25	-	100
TUFTED HAIRGRASS *(Deschampsia cespitosum)*	10	-	100
ALPINE FOXTAIL *(Alopecurus occidentalis)*	22	-	100
IDAHO FESCUE *(Festuca idahoensis)*	7	-	100
TIMOTHY *(Phleum pratense)*	5	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1640 M

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION

TOTAL 2000 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.7(0.9-0.5) HA/AUM or
.57(.45-0.8) AUM/AC

SASMA2. Rough fescue-Sedge

(Festuca scabrella-Carex spp.)

n=18 This community type appears to be the modal grassland community type found on level and gentle south-facing slopes in the Southern Rocky Mountains of the Subalpine subregion. The dominance of rough fescue indicates that this grassland is transitional from the lower Montane subregion. As one moves up in elevation there is a shift away from a Rough fescue-Parry oatgrass dominated community type to a Rough fescue Sedge dominated community type. Willoughby (1992), found that blunt sedge replaced Parry oatgrass as dominant or codominant on steep south-facing slopes, and Richardson needlegrass replaced Parry oatgrass as codominant on more mesic sites in this area. Jaques (1976), described a similar community type from Plateau Mountain to Mount Allan. He felt this community type represented critical wildlife habitat because it remained snow-free for a majority of the winter. Grazing by livestock on these community types should be managed carefully in order to maintain a carryover for wildlife in the winter.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	6	0-19	93
FORBS			
YARROW *(Achillea millefolium)*	6	2-17	100
YELLOW BEARDSTONGUE *(Penstemon confertus)*	3	0-11	50
MOUSE EARED CHICKWEED *(Cerastium arvense)*	2	1-6	100
BEARBERRY *(Arctostaphylos uva-ursi)*	4	0-25	39
STRAWBERRY *(Fragaria virginiana)*	6	0-13	78
OLD MANS WHISKER'S *(Geum triflorum)*	4	0-18	83
GRASSES			
ROUGH FESCUE *(Festuca scabrella)*	17	2-47	100
BLUNT SEDGE *(Carex obtusata)*	11	0-28	89
CALIFORNIA OATGRASS *(Danthonia californica)*	11	0-43	83
RICHARDSON NEEDLEGRASS *(Stipa richardsonii)*	1	0-5	33
HAIRY WILDRYE *(Elymus innovatus)*	6	0-34	72
PARRY OATGRASS *(Danthonia parryi)*	4	0-17	56

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC-MESIC
NUTRIENT REGIME :
MESOTROPHIC
ELEVATION:
1460-2024(1756) M
SOIL DRAINAGE:
WELL
SLOPE: 0-48(15)%
ASPECT SOUTHERLY

ECOLOGICAL STATUS SCORE: 24 OR 16

FORAGE PRODUCTION KG/HA

GRASS	1380 (748-1972)
FORB	676 (224-1412)
SHRUB	49(0-296)
TOTAL	1917(900-3103)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.7 (0.9-0.5) HA/AUM or
0.57 (0.45-0.8) AUM/AC

SASMA2a. Rough fescue-Richardson needlegrass

(Festuca scabrella-Stipa richardsonii)

n=6 This community type occupies benches and gentle south facing slopes in the Southern Rocky Mountains of the Subalpine subregion. Jaques (1980) described a Richardson needlegrass-rough fescue dominated grassland at higher elevations on the northern edge of the foothills. Richardson needlegrass appears to supplant Parry oatgrass as the co-dominant grass on mesic benchlands above 1700 m. This community type is very similar to the Rough fescue-Sedge dominated community, but lacks the high cover of Richardson needlegrass. The Rough fescue-Sedge community may represent a grazing disclimax of this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	2	0-10	50
FORBS			
YARROW *(Achillea millefolium)*	2	0-4	83
YELLOW BEARDSTONGUE *(Penstemon confertus)*	10	0-39	50
MOUSE EARED CHICKWEED *(Cerastium arvense)*	2	1-4	100
STRAWBERRY *(Fragaria virginiana)*	3	0-8	50
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	2	0-9	50
GRASSES			
ROUGH FESCUE *(Festuca scabrella)*	20	10-42	100
PARRY OATGRASS *(Danthonia parryi)*	4	0-7	67
CALIFORNIA OATGRASS *(Danthonia californica)*	9	0-29	67
RICHARDSON NEEDLEGRASS *(Stipa richardsonii)*	13	7-22	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	4	1-7	100
IDAHO FESCUE *(Festuca idahoensis)*	1	1-3	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC-MESIC
NUTRIENT REGIME :
MESOTROPHIC
ELEVATION:
1709(1592-2042)M
SOIL DRAINAGE:
RAPIDLY-WELL
SLOPE: 10(2-26)%
ASPECT SOUTHERLY
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1088
FORB	186
TOTAL	1237(1200-1274)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.7 (0.9-0.7) HA/AUM OR
0.57 (0.45-0.57) AUM/AC

SASMA3. Rough fescue-Hairy wildrye

(Festuca scabrella-Elymus innovatus)

n=11 This community is similar to the Rough fescue-Sedge and R.fescue-Needlegrass dominated community types previously described, but it is found on drier, steeper slopes with poorer soils than the other rough fescue dominated types. As one moves upslope there is a shift in co-dominance of sedge to hairy wildrye and an increase in cover of bearberry and juniper.

Corns and Achuff (1982), described hairy wildrye dominated community types on south facing slopes in the more northern ecodistricts. They felt these grasslands occurred on areas with frequent snow avalanching. It is possible that this community type is associated with deeper snow accumulation than the Rough fescue-Sedge dominated type previously described.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL. *(Potentilla fruticosa)*	4	0-23	91
CREEPING JUNIPER (*Juniperus horizontalis*)	2	0-9	27
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	4	0-16	36
YARROW *(Achillea millefolium)*	3	1-6	100
STRAWBERRY *(Fragaria virginiana)*	4	1-9	100
YELLOW HEDYSARUM (*Hedysarum sulphurscens*)	3	0-10	55
SILVERY PERENNIAL LUPINE (*Lupinus argenteus*)	2	0-9	36
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	21	4-57	100
BLUNT SEDGE *(Carex obtusata)*	5	0-13	64
ROUGH FESCUE (*Festuca scabrella*)	34	8-57	100
PARRY OATGRASS *(Danthonia parryii)*	4	0-24	46

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC -MESIC
NUTRIENT REGIME :
SUBMESOTROPHIC-MESOTROPHIC

ELEVATION:
1620-2042(1854)M
SOIL DRAINAGE:
RAPIDLY
SLOPE:
4-55(26)%
ASPECT:
SOUTHERLY
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1326(1120-1440)
FORB	653(316-1176)
SHRUB	171(0-308)
TOTAL	1662(900-2502)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.7(1.0-0.6) HA/AUM OR
0.57(0.4-0.67) AUM/AC

SASMA3a. Hairy wildrye- Rough fescue -Carex spp.

(Elymus innovatus- Festuca scabrella-Sedge)

n=1 This community is similar to the Rough fescue-Hairy wildrye community type (SASMA3) previously described, but this type was described on a site with a north aspect . Corns and Achuff (1982), described hairy wildrye dominated community types on south facing slopes in the more northern ecodistricts. They felt these grasslands occurred on areas with frequent snow avalanching. It would appear that this community type represents the transition between the northerly hairy wildrye dominated grasslands and the southerly rough fescue-hairy wildrye dominated grasslands.

This community type was described in an area that is difficult for livestock to access. It should likely be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	2	-	100
COMMON JUNIPER *(Juniperus communis)*	1	-	100
FORBS			
YELLOW BEARDTONGUE *(Penstemon confertus)*	4	-	100
MISSOURI GOLDENROD *(Solidago missouriensis)*	2	-	100
FIREWEED *(Epilobium angustifolium)*	4	-	100
ALPINE HEDYSARUM *(Hedysarum alpinus)*	5	-	100
MOUNTAIN DANDELION *(Agoseris glauca)*	2	-	100
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	20	-	100
BLUNT SEDGE *(Carex obtusata)*	1	-	100
ROUGH FESCUE *(Festuca scabrella)*	11	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME :
SUBMESOTROPHIC

ELEVATION:
1951M

SOIL DRAINAGE:
WELL
SLOPE:
30%
ASPECT:
NORTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

TOTAL 1225(900-1500)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.7 (1-0.6) HA/AUM OR
0.58 (0.4-0.68) AUM/AC

SASMA4. Sedge-Hairy wildrye-Slender wheatgrass

(Carex obtusata-Elymus innovatus-Agropyron trachycaulum)

n=11 This community type appears to result from moderate to heavy grazing pressure on a Rough fescue-Sedge dominated community type. Heavy grazing appears to cause rough fescue to decline and allows sedge to increase. Indeed Willoughby et al. (2005), described similar species composition changes with grazing on south facing slopes in the Montane subregion.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	4	0-20	64
FORBS			
STRAWBERRY			
(Fragaria virginiana)	7	1-17	100
WHITE CAMUS			
(Zigadenus elegans)	T	0-1	9
YARROW			
(Achillea millefolium)	7	1-15	100
SMOOTH LEAVED CINQUEFOIL			
(Potentilla diversifolia)	8	0-23	64
BEARBERRY			
(Arctostaphylos uva-ursi)	2	0-18	18
YELLOW BEARDTONGUE			
(Penstemon confertus)	2	0-25	45
OLD MAN'S WHISKERS			
(Geum triflorum)	4	0-11	64
GRASSES			
HAIRY WILDRYE			
(Elymus innovatus)	11	0-28	91
ROUGH FESCUE			
(Festuca scabrella)	5	0-24	73
SLENDER WHEATGRASS			
(Agropyron trachycaulum)	8	0-43	82
IDAHO FESCUE			
(Festuca idahoensis)	2	0-9	82
BLUNT SEDGE			
(Carex obtusata)	17	0-34	73

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
1410-1981(1638) M

SOIL DRAINAGE:
WELL

SLOPE:
0-35(12)%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 16

FORAGE PRODUCTION KG/HA

GRASS	1116(516-1364)
FORB	683(140-1042)
SHRUB	56(0-408)
TOTAL	1891(1404-2318)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.8(1.0-0.7) HA/AUM OR
0.5(0.4-0.57) AUM/AC

SASMA6. Yellow mountain avens

(Dryas drummondii)

n=1 This is similar to the community type described in the Central and Northern Rocky Mountain ecodistricts. Corns and Achuff (1982) described this community type on recent fluvial and glacialfluvial landforms with gentle slopes, where the soils are rapidly drained. Willoughby et al. (2005), described a yellow mountain avens community on dry, gravelly river flats with nutrient poor soils in the Montane subregion. They found this community type to be successionally immature and succession would be to a Balsam poplar dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	4	-	100
FORBS			
YELLOW DRYAD *(Dryas drummondii)*	13	-	100
LATE YELLOW LOCOWEED *(Oxytropis monticola)*	5	-	100
SILVERY CINQUEFOIL *(Potentilla argentea)*	3	-	100
LOW GOLDENROD *(Solidago missouriensis)*	3	-	100
YELLOW HEDYSARUM *(Hedysarum sulphurscens)*	3	-	100
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	6	-	100
JUNEGRASS *(Koeleria macrantha)*	T	-	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	1	-	100
BLUNT SEDGE *(Carex obtusata)*	67	-	100
FRINGED BROME *(Bromus ciliatus)*	5	-	100

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
2165M

SOIL DRAINAGE:
WELL TO RAPIDLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	572
FORB	602
TOTAL	1372 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40(40-8.5) HA/AUM or
.01(.01-.04) AUM/AC

ENVIRONMENTAL VARIABLES

SASMA7. Tufted hairgrass-Sedge

(Deschampsia cespitosa-Carex spp.)

n=3 This community type was described in the Savanna Creek range allotment and is located on moist sites that are better drained and slightly drier than the pure sedge meadows. Willoughby(2005), found that tufted hairgrass is a common plant species on lowland sites in the valley bottoms of the Upper Foothills subregion . Willoughby (1992), found when this community type is protected from grazing for 25-30 years, willow and bog birch expand and tufted hairgrass and sedge decline. The decline in graminoid cover also results in a decline in available forage production . Continuous heavy grazing causes hairgrass to decline and the site will be invaded by Kentucky bluegrass and dandelion.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BARCLAY'S WILLOW *(Salix barclayi)*	3	0-7	33
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	1	0-2	33
FORBS			
LINDLEY'S ASTER *(Aster ciliolatus)*	1	0-2	33
YELLOW HEDYSARUM *(Hedysarum sulphurscens)*	1	0-3	33
YARROW *(Achillea millefolium)*	6	3-10	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	9	6-14	100
OLD MAN'S WHISKERS *(Geum triflorum)*	3	0-9	68
AMERICAN VETCH *(Vicia americana)*	T	0-1	67
GRASSES			
TWO-SEEDED SEDGE *(Carex disperma)*	14	0-42	33
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	41	18-62	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	2	1-4	100
ROUGH FESCUE *(Festuca scabrella)*	2	0-6	33
HAIRY WILDRYE (*Elymus innovatus*)	6	0-18	33

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1445(1445-1450)M

SOIL DRAINAGE: MOD. WELL

SLPOE 4%

ASPECT:NORTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1164
FORBS	162
SHRUBS	0
TOTAL	1326

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.8(1.2-0.7) HA/AUM OR
0.5(.33-.57) AUM/AC

SASMA7a. Marsh reedgrass/Cow parsnip

(Calamagrostis canadensis/Heracleum lanatum.)

n=1 This community type represents moist seepage areas in the foothills west of Turner valley. Often these sites are willow dominated to form the Willow/Marsh reedgrass dominated community type. Marsh reedgrass is characteristic of the lower elevation Lower Foothills subregion. Moving up in elevation into the Subalpine and Upper Foothills subregions, there is often a shift in dominance away from marsh reedgrass to tufted hairgrass on these moist sites. This community type is very similar to the Cow parsnip/Veiny meadow rue community described by Lawrence et al. (2005) in the Lower Foothills subregion. In the Lower Foothills this community type is very productive and is often heavily utilized by livestock. The Marsh reedgrass-Timothy/Cow parsnip (SASMC8) represents a grazing disclimax of this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	4	-	100
RASPBERRY *(Rubus idaeus)*	1	-	100
FORBS			
COW PARSNIP *(Heracleum lanatum)*	3	-	100
FIREWEED *(Epilobium angustifolium)*	25	-	100
WESTERN MEADOW RUE *(Thalictrum occidentalis)*	10	-	100
HORSETAIL *(Equisetum arvense)*	4	-	100
STICKY PURPLE GERANIUM *(Geranium viscosissimum)*	4	-	100
AMERICAN VETCH *(Vicia americana)*	2	-	100
GRASSES			
SEDGE *(Carex spp)*	15	-	100
MARSH REEDGRASS *(Calamagrostis canadensis)*	24	-	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	1	-	100
IDAHO FESCUE *(Festuca idahoensis)*	5	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1768M

SOIL DRAINAGE: MOD. WELL

SLOPE 3%

ASPECT: SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

TOTAL 2000* ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.8(0.9-0.5) HA/AUM OR
0.5(.45-0.8) HA/AUM

SASMA8. Rough fescue-Idaho fescue-Parry oatgrass

(Festuca scabrella-Festuca idahoensis-Danthonia parryii)

n=4 This community was described on lower slope positions in the Castle area. It is very similar to the Rough fescue-Idaho fescue-Parry oatgrass community described on Black Chernozemic soils in the Montane subregion from an elevation of 1300m up to 1900m (Willoughby et al. 2005) Willoughby (1992), described one Rough fescue-dominated site where the species composition had not changed in over 30 years, indicating this maybe the climax community type on river terraces and south facing slopes in the Montane subregion. Indeed Moss and Campbell (1947), found that rough fescue grows almost to the exclusion of other plants in the absence of disturbance. On rocky and gravelly slopes with shallow soils, rough fescue is replaced by Parry oatgrass and Idaho fescue. They also found Parry oatgrass and Idaho fescue increased and rough fescue declined with increased grazing pressure. Willoughby (1992), also described rough fescue and Idaho fescue dominated community types with little Parry oatgrass in the Castle area south of Blairmore. He also found that rose and shrubby cinquefoil tended to increase in cover at higher elevations in these grasslands.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Shrubby cinquefoil *(Potentilla fruticosa)*	4	1-10	100
Prickly rose *(Rosa acicularis)*	3	0-8	75
Forbs			
Showy Aster *(Aster conspicuus)*	8	0-29	75
Common Fireweed *(Epilobium angustifolium)*	4	0-6	75
Cut-leaved anemone *(Anemone multifida)*	2	1-2	100
Graceful Cinquefoil *(Potentilla gracilis)*	1	0-3	75
Long-fruited wild parsley *(Lomatium macrocarpum)*	1	0-4	25
Low goldenrod *(Solidago missouriensis)*	2	0-5	50
Grasses			
Rough Fescue *(Festuca scabrella)*	21	12-27	100
Idaho Fescue *(Festuca idahoensis)*	7	0-13	75
Parry oatgrass *(Danthonia parryi)*	5	0-12	50
Pine reed grass *(Calamagrostis rubescens)*	4	0-15	50
Hairy wildrye *(Elymus innovatus)*	1	0-1	50

Environmental Variables

Moisture Regime:
Subxeric to Submesic

Nutrient Regime:
Submesotrophic to mesotrophic

Elevation:
1838(1680-1974) m

Soil Drainage:
Very rapidly to Well

Slope: 13(6-22)%
Aspect: Variable

Ecological status score: 24

Forage Production Kg/ha

Grass	1146(934-1358)
Forbs	614(488-740)
Shrubs	55(0-109)
Total	1815(1674-1955)

Ecologically sustainable stocking rate
0.5 (0.55-0.45) Ha/AUM or
0.81 (0.73-0.9) AUM/AC

SASMA9. Rough fescue-Sedge/Bearberry

(Festuca scabrella-Carex obtusaia./Arctostaphylos uva-ursi)

n=14 This community is characteristic of dry, south facing slopes, below the crest of the hill. It appears that snow accumulates in these areas favoring the growth of rough fescue. This community is similar to the Rough fescue-Sedge/Bearberry community type described by Willoughby et al. (2005) on hilltops in the Montane subregion. The shallow poorly developed soils appear to favour rough fescue, slender wheatgrass, and sedge over Parry oatgrass. This community is drier than the Rough fescue-Idaho fescue-Parry oatgrass grasslands characteristic of lower slope positions. This community type is similar to the Sedge/Bearberry community type but lacks the high cover of rough fescue. It appears that the Sedge/Bearberry community may represent a grazing disclimax of this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	4	0-11	93
PRICKLY ROSE (*Rosa acicularis*)	1	0-6	43
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	29	6-67	100
SILKY PERENNIAL LUPINE *(Lupinus sericeus)*	2	0-10	43
CUT-LEAVED ANEMONE *(Anemone multifida)*	2	0-2	79
WILD STRAWBERRY *(Fragaria virginiana)*	1	0-9	43
SMOOTH ASTER *(Aster laevis)*	1	0-8	21
LOW GOLDENROD *(Solidago missouriensis)*	1	0-6	50
GRASSES			
ROUGH FESCUE *(Festuca scabrella)*	19	6-43	100
SEDGES *(Carexspp.)*	2	0-5	71
PARRY OATGRASS *(Danthonia Perryi)*	1	0-18	21
JUNEGRASS *(Koeleria macrantha)*	1	0-15	64
HAIRY WILDRYE (*Elymus innovatus*)	2	0-9	40

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC TO MESIC

NUTRIENT REGIME:
OLIGOTROPHIC TO MESOTROPHIC

ELEVATION:
1811(1400-2115)M

SOIL DRAINAGE:
VERY RAPIDLY-WELL
SLOPE:
34(18-70)%
ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	695(102-1612)
FORB	285(111-676)
SHRUB	680(28-4400)
TOTAL	1542(970-5384)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.5(1.5-0.5) HA/AUM OR
0.28 (0.28-0.8) AUM/AC

SASMA10. Parry oatgrass-Rough fescue-Sedge

(Danthonia parryi-Festuca scabrella-Carex spp)

n=12 This community is situated upslope of the rough fescue dominated community types. This community type tends to be drier and better drained than the rough fescue dominated types found in the lower slope positions. The drier site conditions favour the growth of Parry oatgrass and sedge over rough fescue.

These sites are moderately productive and are easily accessible to livestock. They should be considered primary range. Continuous heavy grazing pressure will lead to a community type that is dominated by sedge and fringed sage.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	4	0-10	92
PRICKLY ROSE *(Rosa acicularis)*	3	0-5	75
SASKATOON *(Amelanchier alnifolia)*	2	0-16	50
FORBS			
SILKY PERENNIAL LUPINE *(Lupinus sericeus)*	5	0-18	75
CUT-LEAVED ANEMONE *(Anemone multifida)*	2	0-2	83
OLD MAN'S WHISKERS *(Geum triflorum)*	2	0-21	42
NORTHERN BEDSTRAW *(Galium boreale)*	4	1-8	100
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	2	0-6	67
GOLDENBEAN *(Thermophis rhombifolia)*	4	0-8	42
GRASSES			
ROUGH FESCUE *(Festuca scabrella)*	6	0-15	92
PARRY OATGRASS *(Danthonia parryi)*	23	10-31	100
SEDGES *(Carex spp.)*	3	0-8	94
JUNE GRASS *(Koeleria macrantha)*	3	0-6	92
COLUMBIA NEEDLE GRASS *(Stipa columbiana)*	5	0-13	75
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	1	0-5	75

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC TO SUBXERIC
NUTRIENT REGIME :
OLIGOTROPHIC TO PERMESOTROPHIC
ELEVATION:
1473(1400-1962) M
SOIL DRAINAGE:
RAPIDLY TO WELL
SLOPE:
23(12-33) %
ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	732(356-1284)
FORB	702(0-1550)
SHRUB	96(0-388)
TOTAL	1452(660-2866)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.6 (1.4-0.6) HA/AUM OR
0.57 (0.29-0.67) AUM/AC

SASMA11. Sedge/Bearberry

(Carex spp./Arctostaphylos uva-ursi)

n=11 This community was described on south facing slopes. This community is very similar to the Rough fescue-Sedge/Bearberry community type, but lacks the high cover of rough fescue. A number of the sites described in this community had extensive grazing pressure by bighorn sheep and domestic livestock. It is possible that this community type represents a grazing disclimax of the Rough fescue-Sedge/Bearberry community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
SUBALPINE FIR *(Abies lasiocarpa)*	T	0-2	20
WHITE BARK PINE *(Pinus albicaulis)*	T	0-3	20
SHRUBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	27	6-70	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	2	0-8	70
SASKATOON *(Amelanchier alnifolia)*	4	0-10	50
FORBS			
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	2	0-5	90
BROWN-BRACTED MOUNTAIN EVERLASTING *(Antennaria umbrinella)*	1	0-5	50
YELLOW VALSE DANDELION *(Agoseris glauca)*	1	0-3	70
ARCTIC SANDWORT *(Minuartia obtusiloba)*	1	0-3	40
YELLOW HEDYSARUM *(Hedysarum sulphurescens)*	2	0-6	60
COMMON FIREWEED *(Epilobium angustifolium)*	1	0-3	30
GRASSES			
SEDGES *(Carexspp.)*	1	0-4	80
ROUGH FESCUE *(Festuca scabrella)*	2	0-7	70
IDAHO FESCUE *(Festuca idahoensis)*	1	0-2	80
BLUEBUNCH WHEATGRASS *(Agropyron spicatum)*	3	0-12	90

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBXERIC

NUTRIENT REGIME:
OLIGOTROPHIC TO PERMESOTROPHIC

ELEVATION:
1883(1706-2072)M

SOIL DRAINAGE:
VERY RAPIDLY TO WELL

SLOPE: 31(16-50)%

ASPECT: SOUTH TO WEST

ECOLOGICAL STATUS SCORE: 16

FORAGE PRODUCTION KG/HA

GRASS	733(17-1238)
FORB	391(34-583)
SHRUB	1051(241-2382)
TOTAL	2175(605-4121)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
1.7 (1.7-0.5) HA/AUM OR
0.23 (0.23-0.8) AUM/AC

SASMA12. Silverberry-Rose

(Elaeagnus commutata-Rosa acicularis)

n=1 This community type was described on the downwind side of the hill at lower elevations in the Castle area of the province (north of Waterton Lakes National Park). It appears this area accumulates snow so the moisture regime is favorable for the growth of silverberry and aspen. At 1800 m aspen is at its upper elevational limit. The aspen trees at this site are very stunted and lack the vigour of lower elevation sites. Silverberry is well adapted to growing on dry, gravelly, light soils in ravines, coulees and stream banks throughout Alberta (Wilkinson 1990). It is unusual to have silverberry and aspen growing at these higher elevations indicating that this site is somewhat protected and warmer so that the climate resembles the lower elevation sites.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
TREES			
ASPEN (*Populus tremuloides*)	4	-	100
SHRUBS			
SILVERBERRY (*Elaeagnus commutata*)	15	-	100
PRICKLY ROSE (*Rosa acicularis*)	5	-	100
ASPEN (*Populus tremuloides*)	4	-	100
FORBS			
MOUSE EARED CHICKWEED (*Cerastium arvense*)	6	-	100
FALSE DANDELION (*Agoseris glauca*)	2	-	100
SILVER PLANT (*Eriogonum ovalifolium*)	T	-	100
GRASSES			
ROCKY MOUNTAIN FESCUE (*Festuca brachycaulum*)	1	-	100
BLUEBUNCH WHEATGRASS (*Agropyron spicatum*)	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION: 1841 M

SOIL DRAINAGE: VERY RAPIDLY

SLOPE: 24%

ASPECT: SOUTHEASTERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

TOTAL 500 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.8(1.8-1.0) HA/AUM OR
0.22(0.22-0.4) AUM/AC

SASMA13. Fescue-Junegrass/Early yellow locoweed

(Festuca spp.-Koeleria macrantha/Oxytropis sericea)

n=17 This community type is characteristic of the dry, rocky, windswept ridges in the Castle area north of Waterton Lakes National Park. At higher elevations this community is often replaced by the White mountian avens community which occupies similar sites. This community type is somewhat variable false mountain dandelion and early yellow locoweed were found in the majority of the plots, but in areas where there is slightly more snow accumulation the cover of Idaho fescue increases, and there are larger patches of species like spotted saxifrage, brown bracted mountian everlasting and sandwort. Bareground on these moister areas is usually less than 40%. In contrast bareground on the drier parts of this community type exceed 60%. At lower elevations on Whistler Mtn. bluebunch wheatgrass becomes more prevalent.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	0-13	82
LIMBER PINE *(Pinus flexilis)*	1	0-11	12
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	1	0-8	24
KITTENTAILS *(Besseya wyomingensis)*	1	0-3	59
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	1	0-5	88
SANDWORT *(Minuartia obtusiloba)*	3	0-16	47
LITTLE CLUBMOSS *(Selaginella densa)*	2	0-8	41
SPOTTED SAXIFRAGE *(Saxifraga bronchialis)*	3	0-29	24
GRASSES			
ROUGH FESCUE *(Festuca scabrella)*	1	0-6	24
JUNEGRASS *(Koeleria macrantha)*	2	0-5	77
SEDGE *(Carex spp.)*	3	0-9	82
IDAHO FESCUE *(Festuca idahoensis)*	3	0-20	41
SMOOTH BROME *(Bromus pumpellianus)*	1	0-5	53
BLUEBUNCH WHEATGRASS *(Agropyron spicatum)*	1	0-3	41

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
VERY XERIC TO SUBXERIC

NUTRIENT REGIME:
OLIGOTROPHIC TO MESOTROPHIC

ELEVATION:
1949(1536-2322) M

SOIL DRAINAGE:
VERY RAPIDLY TO WELL

SLOPE: 26(6-50)%

ASPECT: VARIABLE

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	512(18-2018)
FORB	291(44-680)
SHRUB	192(0-589)
TOTAL	994(519-2126)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
2.0 (2.0-1.0) HA/AUM
0..2 (0.2-0.4) AUM/AC

SASMA14. White mountain avens
(Dryas octopetala)

n=12 This community occurs on wind-exposed, snow free ridges and resembles the White mountain avens community described in the Alpine subregion. The soils are shallow, stoney, colluvial Regosols (Corns and Achuff 1982). Ogilvie (1969), found this community type to have an abundance of cushion and mat plants and a large number of lichens. This community is generally found at higher elevations than the Fescue-Junegrass/E. yellow locoweed community type. This community type appears to have no snow accumulation throughout the year, whereas, the fescue, Junegrass dominated community appears to have some snow accumulation. This may account for the differences in dominant plant species for each community type.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	T	0-1	25
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	2	0-6	92
BUFFALOBERRY *(Shepherdia canadensis)*	T	0-3	8
SILVERBERRY (*Elaeagnus commutata*)	T	0-2	8
FORBS			
WHITE MOUNTAIN AVENS *(Dryas octopetala)*	31	14-48	100
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	3	1-7	100
SPOTTED SAXIFRAGE *(Saxifraga bronchialis)*	2	0-7	42
KITTENTAILS *(Besseya wyomingensis)*	1	0-2	83
YELLOW HEDYSARUM (*Hedysarum sulphurscens*)	2	0-4	67
FALSE MTN. DANDELION (*Agoseris glauca*)	1	0-2	83
GRASSES			
IDAHO FESCUE *(Festuca idahoensis)*	1	0-4	33
SEDGE SPP. *(Carex spp.)*	3	0-9	83
SMOOTH BROME *(Bromus pumpellianus)*	1	0-2	67
JUNEGRASS (*Koeleria macrantha*)	1	0-5	67

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
VERY XERIC-SUBXERIC

NUTRIENT REGIME:
OLIGOTROPHIC TO SUBMESOTROPHIC

ELEVATION:
2136(2001-2423) M

SOIL DRAINAGE:
VERY RAPIDLY TO RAPIDLY

SLOPE : 17(7-38)%

ASPECT: VARIABLE

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	36(25-47)
FORB	198(27-369)
SHRUB	392(195-589)
TOTAL	626(269-983)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0 (40.0-0.9) HA/AUM OR
0.01 (0.01-0.45)AUM/AC

SASMA15. Pinegrass-Hairy wildrye/Strawberry

(Calamagrostis rubescens-Elymus innovatus/Fragaria virginiana)

n=4 This community type is similar to the pinegrass dominated community type described on west and north facing slopes in the Montane subregion (Willoughby et al 2005). In the Montane this community represents the transition from grassland to forest on moist sites with northerly aspects. There is usually high forb cover on these sites with strawberry, showy aster, american vetch and silkly perennial lupine being common. Pinegrass and Hairy wildrye are common grass species in the understory of conifer and deciduous stands and their dominance in this community type may indicate a transition to a forested community. The higher moisture conditions on these sites allows for production of over 2000 kg/ha.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	9	1-20	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	1	1-2	100
WHITE MEADOWSWEET *(Spiraea betulifolia)*	1	0-4	25
ASPEN *(Populus tremuloides)*	1	0-3	50
FORBS			
SILKY PERENNIAL LUPINE *(Lupinus sericeus)*	4	1-7	100
SHOWY ASTER *(Aster conspicuus)*	3	1-6	100
COMMON DANDELION *(Taraxacum officinale)*	3	1-8	100
CREAM-COLORED VETCHILING *(Lathyrus ochroleucus)*	2	1-3	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	1	1-2	100
FALSE MTN. DANDELION *(Agoseris glauca)*	1	0	100
GRASSES			
PINEGRASS *(Calamagrostis rubescens)*	11	1-22	100
JUNEGRASS *(Koeleria macrantha)*	2	1-2	100
HAIRY WILDRYE *(Elymus innovatus)*	4	0-11	75
KENTUCKY BLUEGRASS *(Poa pratensis)*	3	0-13	25

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC TO MESIC

NUTRIENT REGIME:
SUBMESOTROPHIC TO MESOTROPHIC

ELEVATION:
1701(1684-1710)M

SOIL DRAINAGE:
WELL TO IMPERFECTLY

SLOPE (RANGE):
31(23-40)%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	758(392-1204)
FORB	1170(506-1884)
SHRUB	110(0-260)
TOTAL	2037(1346-2739)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.8 (1.0-0.5) HA/AUM OR
0.5(0.4-0.8) AUM/AC

SASMA16. Forb meadow

(Epilobium angustifolium)

n=3 This site is similar to the Fireweed-Meadow rue/Sedge dominated community type described in the northern foothills area of the Subalpine. This community is characterized by a dominance of forb species (fireweed, graceful cinquefoil, yellow hedysarum) and only a small cover of grass species. It would appear that the moisture and nutrient regime are higher on this site compared to the other grassland community types which favors the growth of forb species. Succession in the absence of disturbance will likely be to aspen and then white spruce.

The forage production of this community type is fairly high because of the higher moisture and nutrient content of the soil, but the areas are so small and isolated they contribute little to the overall carrying capacity of a disposition.

PLANT COMPOSITION	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	2	1-2	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	1-5	100
CREEPING JUNIPER *(Juniperus horizontalis)*	1	0-2	67
FORBS			
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	3	1-6	100
COMMON FIREWEED *(Epilobium angustifolium)*	6	2-10	100
YELLOWHEDYSARUM *(Hedysarum sulphurescens)*	4	1-9	100
WILD VETCH *(Vicia americana)*	2	1-3	100
WILD STRAWBERRY *(Fragaria virginiana)*	1	1-2	100
CUT-LEAVED ANEMONE *(Anemone multifida)*	1	1-2	100
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	3	1-5	100
PARRYS OATGRASS *(Danthonia parryi)*	2	1-3	100
TIMOTHY *(Phleum pratense)*	1	0-1	67
ROUGH FESCUE *(Festuca scabrella)*	2	0-4	33

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
PERMESOTROPHIC TO MESOTROPHIC

ELEVATION: 1701(1684-1710)

SOIL DRAINAGE:
WELL TO IMPERFECTLY

SLOPE: 3(0-7)%

ASPECT: VARIABLE

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	554(175-1126)
FORB	734(567-1009)
SHRUB	125(0-208)
TOTAL	1413(968-2135)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.6 (1.0-0.6) HA/AUM OR
0.68 (0.4-0.67) AUM/AC

SASMA17. Bluebunch wheatgrass-Sedge

(Agropyron spicatum-Carex obtusata)

n=1 Bluebunch wheatgrass dominated sites are found on well-drained, south facing-slopes in the Montane subregion throughout southern Alberta (Strong 1992). In the Subalpine this community type is found on steep, isolated south facing slopes which have a Montane like microclimate. Increased grazing pressure on the drier sites leads to a decline in bluebunch wheatgrass and allows low growing forbs and sedge species to increase. Forage production on this type can vary from 700 kg/ha on dry sites to over 1600 kg/ha on moister sites.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	-	100
FRINGED SAGE *(Artemisia frigida)*	6	-	100
FORBS			
STRAWBERRY *(Fragaria virginiana)*	4	-	100
YARROW *(Achillea millefolium)*	3	-	100
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	3	-	100
GRASSES			
JUNEGRASS *(Koeleria macrantha)*	9	-	100
BLUNT SEDGE *(Carex obtusata)*	3	-	100
BLUEBUNCH WHEATGRASS *(Agropyron spicatum)*	15	-	100
ROUGH FESCUE *(Festuca scabrella)*	7	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBMESIC

NUTRIENT REGIME:
SUBMESOTROPHIC TO MESOTROPHIC

ELEVATION: 1725 M

SOIL DRAINAGE:
VERY RAPIDLY

SLOPE: 31-45%

ASPECT: SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	600
FORB	350
SHRUB	200
TOTAL	1150

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2(3.5-0.75)) HA/AUM OR
0.2(0.11-.54)) AUM/AC

SASMB1. Willow/Sedge

(Salix spp./Carex spp.)

n=6 Willow encroachment into moist grassland meadows eventually results in this community type. Historically fire has played an important role in the maintenance of the grassland community type in this subregion. Continued fire suppression will eventually allow willow and bog birch to invade many of the grassy meadows. This community type is slightly drier than the Willow/Water sedge dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW *(Salix spp.)*	22	27-32	100
BOG BIRCH *(Betula glandulosa)*	9	1-23	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	3	1-11	100
FORBS			
YARROW *(Achillea millefolium)*	1	0-1	57
WILD STRAWBERRY *(Fragaria virginiana)*	3	0-13	57
LINDLEY'S ASTER *(Aster ciliolatus)*	3	0-9	29
BUCK-BEAN *(Menyanthes trifoliata)*	2	0-5	29
ARROW-LEAVED COLTSFOOT *(Petasites sagittatus)*	1	0-6	29
GRASSES			
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	2	0-6	57
BALTIC RUSH *(Juncus balticus)*	9	0-21	86
SEDGE *(Carex spp.)*	42	15-49	100
HAIRY WILDRYE *(Elymus innovatus)*	1	0-6	14

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC -HYGRIC

NUTRIENT REGIME :
OLIGOTROPIC TO PERMESOTROPHIC

ELEVATION:
1567(1300-1829) M

SOIL DRAINAGE :
WELL TO VERY POORLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	1246(444-1768)
FORB	400(0-1120)
SHRUB	544(0-1200)
TOTAL	2090(1492-2888)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
1.0 (1.0-0.5) HA/AUM OR
0.4 (0.4-.8)AUM/AC

SASMB2. Willow/Richardson needlegrass

(Salix spp./Stipa richardsonii)

n=2 The ecology of this community type is unclear. Stringer (1973) described a Richardson needlegrass shrub savanna on small isolated areas, south facing slopes amongst subalpine fir, spruce, douglas fir forests in Banff and Jasper National Parks. He felt these grassland types were not closely related to any other grassland types.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP.			
(Salix myrtillfolia)	30	20-40	100
BOG BIRCH			
(Betula glandulosa)	5	0-10	50
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	5	0-10	50
FORBS			
SHOWY LOCOWEED			
(Oxytropis splendens)	1	1-2	100
YARROW			
(Achillea millefolium)	1	1-2	100
FIREWEED			
(Epilobium angustifolium)	1	1-2	100
STRAWBERRY			
(Fragaria virginiana)	2	1-2	100
GRASSES			
RICHARDSON NEEDLEGRASS			
(Stipa richardsonii)	45	40-50	100
ROCKY MTN. FESCUE			
(Festuca saximontana)	8	5-10	100
SEDGE			
(Carex spp)	3	1-5	100
QUACK GRASS			
(Agropyron repens)	1	0-2	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1375(1300-1450) M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 24

FORAGE CAPACITY KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
4.0(40-4.0) HA/AUM OR
0.1(.01-0.1) AUM/AC

SASMB3. Whitebark pine

(Pinus albicaulis)

n=1 This is a timberline community type found on steep south facing slopes with subxeric moisture regimes. The trees tend to be very small and shrub like. On moister sites the tree islands would by made up of the subalpine fir community type previously described.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE BARK PINE *(Pinus albicaulis)*	25	-	100
SHRUBS			
SMOOTH WILLOW *(Salix glauca)*	8	-	100
BUFFALOBERRY *(Shepherdia canadensis)*	8	-	100
GROUND JUNIPER *(Juniperus communis)*	3	-	100
FORBS			
BEARBERRY *(Arctostaphylos uva-ursi)*	2	-	100
MOUNTAIN GOLDENROD *(Solidago spathulata)*	2	-	100
STRAWBERRY *(Fragaria virginiana)*	2	-	100
YARROW *(Achillea millefolium)*	1	-	100
GRASSES			
SMOOTH BROME *(Bromus inermis)*	2	-	100
SEDGE *(Carex spp.)*	1	-	100
HAIRY WILDRYE *(Elymus innovatus)*	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
2030 M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
60%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE CAPACITY KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-8.5) HA/AUM OR
.01(.01-.04) AUM/AC

SASMB4. Willow-Bog birch/Rough fescue-Kentucky bluegrass

(Salix spp.-Betula glandulosa\Festuca scabrella-Poa pratensis)

n=2 This community type represents the inside transect of a rangeland reference area which has been protected from grazing for over 30 years. This community type represents moist meadows and grasslands in the Sheep area west of Turner valley. Continuous heavy grazing pressure will cause the cover of shrubs and rough fescue to decline and allow Kentucky bluegrass, timothy and dandelion to invade onto the site.

This area of the province is classified as Lower Foothills (Alberta Environmental Protection 1994), but the plant species of this area are more characteristic of the Parkland and Montane subregions and the higher Subalpine subregion than the Lower Foothills. As a result this community type was placed within the Subalpine subregion guide.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PUSSY WILLOW *(Salix discolor)*	18	14-21	100
BOG BIRCH *(Betula glandulosa)*	13	10-15	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	17	5-28	100
FORBS			
LINDLEY'S ASTER *(Aster ciliolatus)*	7	6-8	100
WOOLLY CINQUEFOIL *(Potentilla hippiana)*	3	0-5	50
STRAWBERRY *(Fragaria virginiana)*	6	2-9	100
YARROW *(Achillea millefolium)*	2	2-2	100
FIREWEED *(Epilobium angustifolium)*	1	0-2	50
VEINY MEADOW RUE *(Thalictrum venulosum)*	3	2-4	100
GRASSES			
KENTUCKY BLUEGRASS *(Poa pratensis)*	10	0-20	50
SEDGE *(Carex spp.)*	5	4-5	100
ROUGH FESCUE *(Festuca scabrella)*	12	11-12	100
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	4	2-5	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME :
PERMESOTROPHIC

ELEVATION:
1425(1400-1450)M

SOIL DRAINAGE:
MOD. WELL

SLOPE: 3(2-5)%

ASPECT: EASTERLY

ECOLOGICAL STATUS SCORE: 16

FORAGE PRODUCTION KG/HA

GRASS	250
FORB	148
SHRUB	1004
TOTAL	1404

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.1(1.2-0.9) HA/AUM OR
0.37(.33-0.45)AUM/AC

SASMB5. Willow/Marsh reedgrass

(Salix spp./Calamagrostis canadensis)

n=4 This community type was described in the Pekisko and Deep Creek allotments which are southwest of Longview. This community represents a small pocket of willow in depressional and seepage areas. It is unusual having a community type dominated by marsh reedgrass in the Subalpine subregion. Marsh reedgrass is more characteristic of wetland sites in the Boreal forest and Lower Foothills subregions of North and Central Alberta. Perhaps this community represents a transition between the Subalpine and lower elevation Montane subregion.

These sites can be highly productive because of the increased moisture and nutrients at the site, but livestock will rarely use these communities and they should be considered non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW			
(*Salix spp.*)	42	13-51	100
BOG BIRCH			
(*Betula glandulosa*)	1	0-3	25
FORBS			
ARROW-LEAVED COLTSFOOT			
(Petasites sagittatus)	2	0-8	25
COMMON HORSETAIL			
(Equisetum arvense)	4	0-10	50
COW PARSNIP			
(Heracleum lanatum)	7	0-25	50
FIREWEED			
(Epilobium angustifolium)	4	0-13	50
TALL LARKSPUR			
(*Delphinium glaucum*)	2	0-7	50
VEINY MEADOW RUE			
(*Delphinium glaucum*)	5	0-16	50
GRASSES			
MARSH REEDGRASS			
(Calamagrostis canadensis)	21	15-25	100
TIMOTHY			
(Phleum pratense)	1	0-3	50
WATER SEDGE			
(Carex aquatilis)	9	0-29	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYGRIC-HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC-EUTROPHIC

ELEVATION:
1550(1390-1737)M

SOIL DRAINAGE:
IMPERFECTLY

SLOPE:
2(0-5)%

ASPECT:
LEVEL

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	900(540-1260)
FORB	88(76-100)
SHRUB	1276(844-1708)
TOTAL	1916(1509-2324)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
1.0 (1.0-0.4) HA/AUM
0.4 (0.4-1.01) AUM/AC

SASMB6. Smooth willow-Shrubby cinquefoil/Hairy wildrye

(Salix glauca-Potentilla fruticosa/Elymus innovatus)

n=1 This community type was described on mesic lower slope positions in the Upper Subalpine at or near treeline. Snow accumulates on these sites or seepage occurs during the growing season favoring the growth of willow. This community type is moister and has better developed soils than the smooth willow-juniper community that occurs on similar slope positions. This community type is moderately productive for domestic livestock, but the high elevation will often limit accessibility. Grazing of this community should be done with caution because recovery from over-grazing will take some time because of the poor growing conditions.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ENGELMANN SPRUCE (*Picea engelmannii*)	1	-	100
SHRUBS			
SMOOTH WILLOW (*Salix glauca*)	50	-	100
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	3	-	100
FORBS			
ALPINE HEDYSARUM (*Hedysarum alpinum*)	8	-	100
FIREWEED (*Epilobium angustifolium*)	5	-	100
SWEET FLOWERED ANDROSACE (*Androsace chamaejasme*)	3	-	100
STRAWBERRY (*Fragaria virginiana*)	3	-	100
GRASSES			
HAIRY WILDRYE (*Elymus innovatus*)	9	-	100
SEDGE (*Carex spp.*)	4	-	100
SHEEP FESCUE (*Festuca saximontana*)	2	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC
NUTRIENT REGIME:
SUBMESOTROPHIC
ELEVATION:
1940M
SOIL DRAINAGE:
WELL
SLOPE:
20%
ASPECT:
EASTERLY
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	810
FORB	712
SHRUB	716
TOTAL	2238

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0(1.3-0.9) HA/AUM OR
0.4(0.31-0.45) AUM/AC

SASMB7. Smooth willow-Juniper/Hairy wildrye

(Salix glauca-Juniperus communis/Elymus innovatus)

n=3 This community type occurs on steep subxeric slopes in the Upper Subalpine. Corns and Achuff (1982) described a similar community type on steep southerly facing slopes in Banff and Jasper National Parks. They felt that these sites were commonly snow avalanched. The snow accumulation appears to favour the growth of willow. Willow cover on this community type is quite variable. Where snow accumulates willow cover will be fairly dense. This community type is moderately productive for domestic livestock, but the high elevation will often limit accessibility. Grazing of this community type should be done with caution because recovery from over-grazing will take some time because of the poor growing conditions.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ENGELMANN SPRUCE (*Picea engelmannii*)	4	1-7	100
SHRUBS			
SMOOTH WILLOW (*Salix glauca*)	13	3-30	100
COMMON JUNIPER (*Juniperus communis*)	6	1-15	100
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*	1	0-2	66
FORBS			
BEARBERRY (*Arctostaphylos uva-ursi*)	3	0-9	33
ALPINE HEDYSARUM (*Hedysarum alpinum*)	5	0-12	66
ALPINE GOLDENROD (*Solidago multiradiata*)	3	0-3	66
FIREWEED (*Epilobium angustifolium*)	1	0-1	66
GRASSES			
HAIRY WILDRYE (*Elymus innovatus*)	8	2-11	100
ROUGH FESCUE (*Festuca scabrella*)	2	0-4	66
SEDGE (*Carex spp.*)	1	1-2	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC-SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
2013(2000-2026)M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
65(60-70)%

ASPECT:
EASTERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	572(568-576)
FORB	421(388-454)
SHRUB	235(0-470)
TOTAL	1228(956-1500)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.2(1.3-0.9) HA/AUM OR
0.33(0.31-0.45) AUM/AC

SASMB8 Willow/Tufted hairgrass-Kentucky bluegrass

(Salix spp./Deschampsia cespitosa-Poa pratensis)

n=1 This community type represents the grazed and disturbed community of the Willow/Tufted hairgrass-Sedge community. Continued heavy grazing will often lead to a Willow/Kentucky bluegrass dominated community type. The high productivity and open nature of this community make it extremely attractive fo domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LODGEPOLE PINE (*Pinus contorta*)	4	-	100
SHRUBS			
BASKET WILLOW (*Salix petiolaris*)	25	-	100
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	7	-	100
FORBS			
LINDLEY'S ASTER *(Aster ciliolatus)*	3	-	100
MOUNTAIN VALERIAN *(Valeriana dioica)*	2	-	100
VEINY MEADOW RUE *(Thalictrum venulosum)*	2	-	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	2	-	100
GRASSES			
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	21	-	100
TIMOTHY *(Phleum pratense)*	3	-	100
KENTUCKY BLUEGRASS *(Poa pratensis)*	2	-	100
CREEPING RED FESCUE (*Festuca rubra*)	5	-	100
SEDGE (*Carex spp.*)	4	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1600M

SOIL DRAINAGE:
MOD. WELL
SLOPE:
5%

ASPECT:
WEST

ECOLOGICAL STATUS SCORE: 16

FORAGE PRODUCTION KG/HA

GRASS	1734
FORB	248
TOTAL	1982

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0 (1.1-0.8)HA/AUM OR
0.4 (0.36-0.5)AUM/AC

SASMB9 Bebb willow/Pinegrass

(Salix bebbiana/Calamagrostis rubescens)

n=1 This community type represents the ecotone between moist lower slope positions that are dominated by willow and forest communities dominated by lodgepole pine. Plant species characteristic of both moist and mesic moisture regimes can be found in this community type making the community very diverse. In the absence of disturbance the site will eventually become drier and it will likely succeed to a lodgepole pine dominated community. The shrub and tree cover are so dense in this community that livestock have a difficult time accessing the forage. Consequently, this community type should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LODGEPOLE PINE (*Pinus contorta*)	20	-	100
WHITE SPRUCE (*Picea glauca*)	10	-	100
SHRUBS			
BEBB WILLOW (*Salix bebbiana*)	51	-	100
BRACTED HONEYSUCKLE (*Lonicera involcrata*)	3	-	100
PRICKLY ROSE (*Rosa acicularis*)	2	-	100
FORBS			
LINDLEY'S ASTER *(Aster ciliolatus)*	14	-	100
SCOURING RUSH *(Equisetum scirpoides)*	15	-	100
FIREWEED *(Epilobium angustifolium)*	9	-	100
STRAWBERRY *(Fragaria virginiana)*	6	-	100
GRASSES			
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	4	-	100
PINEGRASS *(Calamagrostis rubescens)*	5	-	100
SEDGE BEAKED (*Carex rostrata*)	5	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1600M

SOIL DRAINAGE:
IMPERFECTLY
SLOPE:
5%
ASPECT:
EASTERLY
ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION KG/HA

GRASS	150
FORB	100
SHRUB	1000
TOTAL	1250

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
3.6 (5.0-2.0)HA/AUM
0.17 (0.08-0.2)AUM/AC

SASMC1. Parry oatgrass-Rough fescue-Kentucky bluegrass

(Danthonia parryii-Festuca scabrella-Poa pratensis)

n=8 This community type represents the grazing disclimax community of the Rough fescue-Idaho fescue-Parry oatgrass community type. Increased grazing pressure favours the growth of Parry oatgrass and sedge over rough fescue. Continued heavy grazing pressure eventually leads to a decline in all native species and the site is often dominated by only Kentucky bluegrass, timothy and dandelion. Recovery of this community type back to a rough fescue dominated site is possible with a reduction in grazing pressure, but once Kentucky bluegrass establishes in the stand it will likely remain as a co-dominant.

This community type is very productive and should be considered primary range.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Prickly Rose *(Rosa acicularis)*	1	0-3	64
Saskatoon *(Amelanchier alnifolia)*	1	0-1	13
Shrubby cinquefoil *(Potentilla fruticosa)*	4	0-9	88
Forbs			
Yarrow *(Achillea millefolium)*	2	1-10	100
Wild Strawberry *(Fragaria virginiana)*	1	0-6	63
Three flowered avens *(Geum triflorum)*	9	0-21	88
Graceful cinquefoil *(Potentilla gracilis)*	3	1-11	100
Dandelion *(Taraxacum officinale)*	3	1-9	88
American vetch *(Vicia americana)*	4	0-13	88
Grasses			
Parry oatgrass *(Danthonia parryi)*	16	6-25	100
Rough fescue *(Festuca scabrella)*	8	1-13	100
Kentucky bluegrass *(Poa pratensis)*	6	0-13	86
Idaho fescue *(Festuca idahoensis)*	4	0-1	75
Timothy *(Phleum pratense)*	4	0-10	75

Environmental Variables

Moisture Regime :
Xeric to submesic
Nutrient Regime :
Submesotrophic to Mesotrophic
Elevation:
1502(1397-1601)m
Soil Drainage :
Rapidly to Well
Slope:
19(0-50)%
Aspect:
South easterly

Ecological status score: 16 or 8

Forage Production Kg/ha

Grass	1234(654-1602)
Forb	640(382-1140)
Shrub	19(0-118)
Total	1613(660-2448)

Ecologically sustainable Stocking rate
0.6 (1.4-0.4) ha/AUM or
0.68 (0.29-1.01) AUM/ac

SASMC2. Parry oatgrass-Kentucky bluegrass-Sedge

(Danthonia parryi-Poa pratensis-Carex spp.)

n=7 This community type represents a heavily grazed Parry oatgrass-Rough fescue-Sedge community type. Heavy grazing pressure favours the growth of grazing resistant species of Kentucky bluegrass and sedge and causes rough fescue to decline. Continued heavy grazing pressure will eventually lead to a community type that is dominated by Kentucky bluegrass, timothy and sedge. If the grazing pressure is reduced on this community type there is a good possibility of recovery.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(*Potentilla fruticosa*)	6	1-15	100
SASKATOON			
(Amelanchier alnifolia)	5	0-23	57
FORBS			
THREE FLOWERED AVENS			
(Geum triflorum)	3	0-9	71
EARLY YELLOW LOCOWEED			
(Oxytropis sericea)	4	0-16	71
SILKY PERENNIAL LUPINE			
(Lupinus sericeus)	3	0-14	57
CUT-LEAVED ANEMONE			
(Anemone multifida)	2	0-5	71
GRASSES			
PARRY OATGRASS			
(Danthonia parryi)	15	6-22	100
KENTUCKY BLUEGRASS			
(Poa pratensis)	13	2-27	100
SEDGE			
(Carex spp)	4	0-6	84
JUNEGRASS			
(Koeleria macrantha)	3	0-7	84
TIMOTHY			
(Phleum pratense)	3	0-15	71
ROUGH FESCUE			
(*Festuca scabrella*)	3	1-9	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC TO SUBMESIC

NUTRIENT REGIME:
SUBMESOTROPHIC TO MESOTROPHIC

ELEVATION:
1411(1400-1441)M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
25(13-30)%

ASPECT:
SOUTHWESTERLY

ECOLOGICAL STATUS SCORE: 16 OR 8

FORAGE PRODUCTION KG/HA

GRASS	1140(0-2018)
FORB	685(108-2330)
SHRUB	79(0-238)
TOTAL	1894(1408-2330)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.8(1.4-0.4) HA/AUM OR
0.5 (0.29-1.0) AUM/AC

SASMC3. Meadow foxtail-Kentucky bluegrass

(Alopecurus pratensis-Poa pratensis)

n=3 This community type was described in the South Sheep allotment. It represents small aspen stands that were cleared and seeded to a mixture of meadow brome, creeping red fescue, clover and meadow foxtail. These sites have continued to be heavily grazed which has favoured the growth of meadow foxtail, Kentucky bluegrass and clover. Meadow foxtail is not particularly palatable to livestock and therefore gains a competitive advantage over meadow brome and creeping red fescue, in these seeded areas.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL			
(Potentilla fruticosa)	T	0-1	33
PRICKLY ROSE			
(Rosa acicularis)	T	0-1	33
FORBS			
COMMON DANDELION			
(Taraxacum officinale)	8	4-12	100
STICKY PURPLE GERANIUM			
(Geranium viscosissimum)	1	0-2	100
CLOVER			
(Trifolium spp.)	11	0-32	67
WESTERN MEADOW RUE			
(Thalictrum occidentale)	3	0-4	67
GRASSES			
MEADOW FOXTAIL			
(Alopecurus pratensis)	23	14-33	100
SEDGE			
(Carex spp.)	4	1-6	100
KENTUCKY BLUEGRASS			
(Poa pratensis)	24	14-36	100
TIMOTHY			
(Phleum pratense)	1	1-2	100
RED FESCUE			
(Festuca rubra)	6	0-15	67

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC TO PERMESOTROPHIC

ELEVATION:
1375(1300-1424)M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

SLOPE:
7(2-10)%

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: MODIFIED OR TAME PASTURE

FORAGE PRODUCTION KG/HA

GRASS	2775(2552-3132)
FORBS	507(306-608)
TOTAL	3282(2946-3160)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.5 (0.9-0.3) HA/AUM
0.8 (0.45-1.35)AUM/AC

SASMC4. Fringed sage/Kentucky bluegrass-Parry oatgrass

(Artemisia frigida/Poa pratensis-Danthonia parryi)

n=1 This community type was described on a south facing slope and ridge top in the South Sheep allotment. It appears to represent long-term heavy grazing pressure on a Parry oatgrass-Rough fescue-Sedge dominated community type. The increased grazing pressure on these south facing slopes favours the growth of fringed sage, sedge, Kentucky bluegrass and dandelion. It is unusual having such a high cover of Kentucky bluegrass on these slopes. Kentucky bluegrass usually prefers moister lower slope positions. Perhaps the higher precipitation received in the Subalpine subregion compared to the Montane makes the south facing slopes more favorable to Kentucky bluegrass invasion.

There is still a strong component of native species in this community type and recovery is likely if the grazing pressure is reduced.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PASTURE SAGE (*Artemisia frigida*)	16	-	100
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	4	-	100
FORBS			
GOLDEN BEAN *(Thermopsis rhombifolia)*	5	-	100
EARLY YELLOW LOCOWEED *(Oxytropis sericea)*	2	-	100
COMMON DANDELION *(Taraxacum officinale)*	2	-	100
NATIVE VETCH *(Vicia americana)*	2	-	100
COMMON GOATS BEARD (*Tragopogon dubius*)	1	-	100
GRASSES			
KENTUCKY BLUEGRASS *(Poa pratensis)*	12	-	100
PARRY OATGRASS *(Danthonia parryi)*	9	-	100
ROUGH FESCUE *(Festuca scabrella.)*	8	-	100
COLUMBIA NEEDLE GRASS *(Stipa columbiana)*	8	-	100
JUNEGRASS (*Koeleria macrantha*)	6	-	100
SEDGE SPP. (*Carex spp.*)	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC
NUTRIENT REGIME:
SUBMESOTROPHIC
ELEVATION:
1450M
SOIL DRAINAGE:
RAPIDLY
SLOPE:
33%
ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 8 OR 0

FORAGE PRODUCTION KG/HA

GRASS	704
FORB	490
SHRUB	236
TOTAL	1430

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0(1.2-0.6)HA/AUM
0.4(0.33-0.67) AUM/AC

SASMC5. Rough fescue-Kentucky bluegrass

(Festuca scabrella-Poa pratensis)

n=3 This community type was described in the South Sheep allotment west of Turner valley and represents a rough fescue grassland that has been heavily grazed to the point of Kentucky bluegrass invasion and is now recovering. Long-term heavy grazing pressure leads to a decline in rough fescue and an increase in Parry oatgrass and sedge species. Continued grazing pressure reduces the competitive advantage of rough fescue and the other native grass species and allows Kentucky bluegrass to establish on site. Protection or a reduction in stocking level at the point where Kentucky bluegrass becomes a significant of the community allows rough fescue to recover, but it seems Kentucky bluegrass also remains as co-dominant.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	5	1-8	100
FORBS			
OLD MAN WHISKER'S *(Geum triflorum)*	2	1-3	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	2	1-3	100
NORTHERN BEDSTRAW *(Galium boreale)*	2	1-2	100
YARROW *(Achillea millefolium)*	2	1-2	100
GRASSES			
KENTUCKY BLUEGRASS *(Poa pratensis)*	13	7-20	100
CALIFORNIA OATGRASS *(Danthonia californica)*	6	0-15	67
ROUGH FESCUE *(Festuca scabrella.)*	20	11-35	100
HAIRY WILDRYE (*Elymus innovatus*)	1	0-4	67
IDAHO FESCUE (*Festuca idahoensis*)	2	1-3	100
SLENDER WHEATGRASS (*Agropyron trachycaulum*)	3	1-4	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBMESIC

NUTRIENT REGIME:
MESOTROPHIC- PERMESOTROPHIC

ELEVATION:
1663(1500-1672)M

SOIL DRAINAGE:
WELL-RAPIDLY

SLOPE:
27(0-50)%
ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 24 OR 16

FORAGE PRODUCTION KG/HA

GRASS	1400(1356-1444)
FORB	485(190-780)
TOTAL	1885(1546-2224)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.5 (0.6-0.4) HA/AUM OR
0.81 (0.68-1.01) AUM/AC

SASMA5. Kentucky bluegrass/Dandelion

(Poa pratensis/Taraxacum officinale)

n=20 This community type represents a moist, tufted hairgrass-sedge dominated community type that has been heavily grazed. Heavy grazing pressure causes tufted hairgrass to decline and allows sedge and Kentucky bluegrass to increase. Continuous heavy grazing pressure will eventually cause all native species to decline on the site and the site will become dominated by Kentucky bluegrass, dandelion and clover (Willoughby 1992).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BRISTLY BLACK CURRANT			
(*Ribes lacustre*)	1	0-7	7
FORBS			
DANDELION			
(Taraxacum officinale)	10	1-29	100
YARROW			
(Achillea millefolium)	6	2-28	100
FIREWEED			
(Epilobium angustifolium)	2	0-19	30
GRACEFUL CINQUEFOIL			
(Potentilla gracilis)	2	0-7	55
CLOVER			
(Trifolium spp.)	7	0-48	60
GRASSES			
KENTUCKY BLUEGRASS			
(Poa pratensis)	32	0-63	80
RUSH LIKE SEDGE			
(Carex scirpoidea)	2	0-26	7
TUFTED HAIRGRASS			
(Deschampsia cespitosum)	1	0-5	20
TIMOTHY			
(Phleum pratense)	11	0-28	70

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1507(1340-1798)M

SOIL DRAINAGE:
MODERATELY WELL

SLOPE:
6(0-20)%

ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 0

FORAGE PRODUCTION KG/HA

GRASS	1708(248-3700)
FORB	403(252-889)
SHRUB	104(0-198)
TOTAL	2170(746-4589)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.9 (1.2-0.2) HA/AUM OR
0.45(0.34-2.04) AUM/AC

SASMC6. Kentucky bluegrass-Rough fescue

(Poa pratensis-Festuca scabrella)

n=17 Long-term heavy grazing pressure leads to a decline in rough fescue and an increase in Parry oatgrass and sedge species. Continued grazing pressure reduces the competitive advantage of rough fescue and the other native grass species and allows Kentucky bluegrass to establish on site. Continued heavy grazing pressure eventually leads to a decline in all native species and the plant community will resemble a Timothy-Kentucky bluegrass/dandelion type.

The forage productivity of this community type (2300 kg/ha) is equivalent to or better than a lightly grazed Rough fescue dominated community (1900 kg/ha). However, rough fescue is a more desirable forage species because it maintains it nutrient content into the dormant season. In contrast, Kentucky bluegrass loses its palatability and nutrient content if is allowed to flower and set seed.

Plant Composition Canopy Cover(%)

	Mean	Range	Const.
Shrubs			
Shrubby cinquefoil *(Potentilla fruticosa)*	2	0-15	83
Forbs			
Three flowered avens *(Geum triflorum)*	3	0-16	79
Wild strawberry *(Fragaria virginiana)*	2	0-8	88
Graceful cinquefoil *(Potentilla gracilis)*	3	0-13	77
Late yellow locoweed *(Oxytropis monticola)*	1	0-5	47
Yellow false dandelion *(Agoseris glauca)*	1	0-10	53
Dandelion (*Taraxacum officinale*)	2	0-12	88
Grasses			
Kentucky bluegrass *(Poa pratensis P.compressa)*	12	2-21	100
Timothy *(Phleum pratense)*	5	0-26	82
Rough fescue *(Festuca scabrella.)*	1	0-5	59
Idaho fescue *(Festuca idahoensis)*	1	0-12	53

Moisture Regime:
Subxeric to Subhygric

Nutrient Regime:
Submesotrophic to Permesotrophic
(Poor to rich)

Elevation:
1623(1502-1798)m

Soil Drainage:
Very rapidly to moderately well

Slope: 220(2-45)%

Aspect: Variable

Ecological status score: 8

Forage Production Kg/ha

Grass	1284(85-3584)
Forb	781(126-2312)
Shrub	120-45)
Total	2072(421-4733)

Ecologically sustainable Stocking rate
0.8(2.2-0.4) ha/AUM or
0.5(0.18-1.01)) AUM/AC

Environmental Variables

SASMC7. Timothy-Kentucky bluegrass/Fireweed

(Phleum pratense-Agropyron trachycaulum/Epilobium angustifolium)

n=8 This community type was described in moist lower slope positions. Heavy grazing pressure has caused the native grass species to decline and allowed Canada bluegrass and timothy to invade onto the site. The presence of fireweed indicates that the site will likely succeed to an aspen dominated community type.

This community type is highly productive and it is easily accessible to domestic livestock. It should be rated as primary range.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE (*Rosa acicularis*)	2	0-10	50
SHRUBBY CINQUEFOIL (*Potentilla fruticosa*)	1	0-2	38
FORBS			
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	6	1-13	100
FIREWEED *(Epilobium angustifolium)*	2	0-8	86
COMMON DANDELION *(Taraxacum officinale)*	11	1-26	100
NATIVE VETCH *(Vicia americana)*	3	0-7	86
STICKY PURPLE GERANIUM (*Geranium viscosissimum*)	5	0-15	86
GRASSES			
TIMOTHY *(Phleum pratense)*	50	19-64	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	2	0-10	42
ROUGH FESCUE *(Festuca scabrella.)*	2	0-4	71
CALIFORNIA OATGRASS *(Danthonia californica)*	2	0-15	14
KENTUCKY BLUEGRASS *(Poa pratensis)*	4	0-11	86
SEDGE *(Carex spp.)*	6	0-10	88

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1511(1524-1655)M

SOIL DRAINAGE:
WELL

SLOPE:
5(1-5)%

ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 0 OR MODIFIED

FORAGE PRODUCTION KG/HA

GRASS	4030(1368-7740)
FORB	863(550-1060)
SHRUB	33(0-144)
TOTAL	4926(2482-8494)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.5 (0.8-0.2) HA/AUM OR
0.8 (0.5-2.04 AUM/AC

SASMC8. Marsh reedgrass-Timothy/Cow parnsip

(Calamagrostis canadensis-Phleum pratense/Heracleum lanatum)

n=1 This community type represents seepage areas in the foothills west of Turner valley. Often these areas are invaded by willow to form the Willow/Marsh reedgrass dominated community type. This community type is very similar to the Marsh reedgrass/Cow parnsip community previously described, but this community has a high cover of timothy. Timothy, Kentucky bluegrass and dandelion will often invade these sites when exposed to heavy grazing pressure. This community type is highly productive and should be rated as primary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
RASPBERRY (*Rubus idaeus*)	6	-	100
FORBS			
COW PARSNIP *(Heracleum lanatum)*	28	-	100
FIREWEED *(Epilobium angustifolium)*	3	-	100
COMMON DANDELION *(Taraxacum officinale)*	3	-	100
CANADA VIOLET *(Viola canadensis)*	20	-	100
WHITE GERANIUM (*Geranium richardsonii*)	10	-	100
WESTERN MEADOW RUE (*Thalictrum occidentalis*)	15	-	100
GRASSES			
TIMOTHY *(Phleum pratense)*	29	-	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	3	-	100
MOUNTAIN BROME *(Bromus carinatus.)*	2	-	100
MARSH REEDGRASS *(Calamagrostis canadensis)*	37	-	100

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1570M

SOIL DRAINAGE:
MOD. WELL

SLOPE:
10%

ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 8

FORAGE PRODUCTION KG/HA

GRASS	1369
FORB	1245
TOTAL	2613

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.8(1.0-0.5) HA/AUM OR
0.5(0.4-0.8) AUM/AC

ENVIRONMENTAL VARIABLES

SASMC9. Idaho fescue-Rough fescue/Bearberry

(Festuca idahoensis-Festuca scabrella/Arctostaphylos uva-ursi)

n=2 This community type represents a Rough fescue/Bearberry plant community that has been heavily to moderately grazed for a number of years. Increased grazing pressure causes rough fescue to decline and allows Idaho fescue, timothy and sedge species to increase. If grazing pressure is reduced on this site it will likely succeed back to a rough fescue dominated community.

Plant Composition	**Canopy Cover(%)** Mean	Range	Const.
Shrubs			
Shrubby cinquefoil (*Potentilla fruticosa*)	1	1-2	100
Common juniper (*Juniperus communis*)	7	0-15	50
Forbs			
Bearberry (*Arctostaphylos uva-ursi*)	22	13-30	100
Old mans whiskers (*Geum triflorum*)	16	4-27	100
Strawberry (*Fragaria virginiana*)	11	4-16	100
Yarrow (*Achillea millefolium*)	7	6-8	100
Northern bedstraw (*Galium boreale*)	6	5-7	100
American vetch (*Vicia americana*)	6	2-9	100
Grasses			
Idaho fescue (*Festuca idahoensis*)	26	20-31	100
Rough fescue (*Festuca scabrella*)	9	4-13	100
Northern wheatgrass (*Agropyron dasystachyum*)	5	4-6	100
Junegrass (*Koeleria macrantha*)	4	1-6	100

Environmental Variables

Moisture Regime:
Submesic
Nutrient Regime:
Mesotrophic
Elevation:
1500-1510(1505m)
Soil Drainage:
Well
Slope:
2(1-3%)
Aspect:
Variable
Ecological status score: 16

Forage Production Kg/ha

Grass	1408(1012-1804)
Forb	862(434-1290)
Shrub	43(0-86)
Total	2313(2302-2324)

Ecologically sustainable Stocking rate
1.6 (1.8-0.7)ha/AUM or
0.25(0.22-0.57)AUM/AC

SASMC10. Tufted hairgrass-Kentucky bluegrass

(Deschampsia cespitosa-Poa pratensis)

n=2 This community type is similar to the other Kentucky bluegrass dominated community types, but grazing pressure has been lighter or it was heavy and then became more moderate because of reduced stocking rates or rotational grazing. Willoughby (1992), found that tufted hairgrass could compete with Kentucky bluegrass in the absence of grazing, but it appears that once Kentucky bluegrass is established it remains to form a stable community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	2	0-3	50
WILLOW *(Salix spp.)*	4	0-7	50
FORBS			
DANDELION *(Taraxacum officinale)*	7	1-14	100
STICKY PURPLE GERANIUM *(Geranium viscosissmum)*	2	0-3	50
STRAWBERRY *(Fragaria virginiana)*	1	0-2	50
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	5	0-9	50
YARROW *(Achillea millefolium)*	5	1-10	100
GRASSES			
KENTUCKY BLUEGRASS *(Poa pratensis)*	10	5-15	100
SLENDER WHEATGRASS *(Agropyron trachycaulum)*	3	1-4	100
TUFTED HAIRGRASS *(Deschampsia cespitosa)*	54	49-59	100
SEDGE *(Carex spp..)*	1	0-1	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
PERMESOTROPHIC
ELEVATION:
1585(1440-1730)M
SOIL DRAINAGE:
MODERATELY WELL
ASPECT:
VARIABLE
SLOPE:
4(3-5)%
ECOLOGICAL STATUS SCORE: 24 OR 16

FORAGE PRODUCTION(KG/HA)

GRASS:	2792(2088-3496)
FORBS:	405(262-548)
TOTAL:	3197(2350-4044)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.9(1.2-0.7)) HA/AUM OR
0.45(0.33-0.57) AUM/AC

SASMC11. Creeping red fescue/Clover

(Festuca rubra/Trifolium repens)

n=3 This community type represents old range improvement sites in the North Sheep allotment. These sites were developed by clearing, breaking and seeding selected aspen dominated community types throughout the allotment. These sites are highly productive and should be rated as primary range. In the absence of disturbance these community types will likely succeed back to aspen. Community SASMC12 represents the early stages of this successional sequence.

PLANT COMPOSITION CANOPYCOVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
ROSE			
(Rosa acicularis)	1	1-2	100
FORBS			
DANDELION			
(Taraxacum officinale)	2	1-3	100
CLOVER			
(Trifolium repens)	17	8-33	100
STRAWBERRY			
(Fragaria virginiana)	4	3-6	100
PEAVINE			
(Lathyrus ochroleucus)	2	0-4	66
GRASSES			
CREEPING RED FESCUE			
(Festuca rubra)	47	29-68	100
ORCHARDGRASS			
(Dactylis glomerata)	7	1-13	100
PINEGRASS			
(Calamagrostis rubescens)	3	1-5	100
TIMOTHY			
(Phleum pratense)	1	0-3	66

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
1488(1488-1505)M

SOIL DRAINAGE:
WELL

ASPECT:
SOUTHERLY

SLOPE:
17(10-20))%

ECOLOGICAL STATUS SCORE: TAME PASTURE

FORAGE PRODUCTION(KG/HA)

GRASS:	1916
FORBS:	152
SHRUBS	52
TOTAL:	2120

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.5 (0.8-0.4)HA/AUM
0.8(0.5-1.01) AUM/AC

SASMC12. Rose/Pinegrass
(Rosa acicularis/Calamagrostis rubescens)

n=1 This community type represents an old range improvement site that is slowly succeeding back to an aspen dominated forest. In the absence of disturbance native species such as rose, aspen and pinegrass will slowly encroach onto these old tame pastures.

PLANT COMPOSITIONCANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
ROSE *(Rosa acicularis)*	13	-	100
SNOWBERRY *(Symphoricarpos occidentalis)*	4	-	100
FORBS			
WILD BERGAMONT *(Monarda fistulosa)*	12	-	100
STICKY PURPLE GERANIUM *(Geranium viscosissmum)*	9	-	100
STRAWBERRY *(Fragaria virginiana)*	3	-	100
AMERICAN VETCH *(Vicia americana)*	7	-	100
SMOOTH ASTER *(Aster laevis)*	6	-	100
GRASSES			
SMOOTH WILDRYE *(Elymus glaucus)*	10	-	100
PINEGRASS *(Calamagrostis rubescens)*	7	-	100
SMOOTH BROME *(Bromus inermis)*	4	-	100
CREEPING RED FESCUE *(Festuca rubra)*	4	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC
NUTRIENT REGIME:
MESOTROPHIC
ELEVATION:
1590M
SOIL DRAINAGE:
WELL
ASPECT:
SOUTHERLY
SLOPE:
30%
ECOLOGICAL STATUS SCORE: TAME PASTURE

FORAGE PRODUCTION(KG/HA)

GRASS:	444
FORBS:	452
SHRUB	120
TOTAL:	1016

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0(1.2-0.8) HA/AUM
0.4(.33-0.5) AUM/AC

SASMC13. Idaho fescue-Sheep fescue-Canada bluegrass

(Festuca idahoensis-Festuca saximontant-Poa compressa)

n=1 This community type represents a heavily grazed, gravelly river flat adjacent to Pekisko Creek. In the absence of disturbance this plant community will likely be dominated by rough and Idaho fescue. As one moves up in elevation from the Montane to the Subalpine thereis a shift away from a Rough fescue-Parry oatgrass dominated community type to a Rough fescue Sedge dominatedcommunity type. Jaques (1976), described a Rough fescue-Sedge dominated community type from Plateau Mountain to Mount Allan. He felt thiscommunity type represented critical wildlife habitat because it remained snow-free for a majority of the winter. Grazing by livestock on these community types should be managed carefully in order to maintain a carryover for wildlife in the winter.

PLANT COMPOSITIONCANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
ROSE			
(Rosa acicularis)	7	-	100
SASKATOON			
(Amelanchier alnifolia)	2	-	100
FORBS			
WILD BERGAMONT			
(Monarda fistulosa)	5	-	100
STICKY PURPLE GERANIUM			
(Geranium viscosissmum)	7	-	100
SHOWY LOCOWEED			
(Oxytropis splendens)	10	-	100
Missouri Goldenrod			
(Solidago missouriensis)	15	-	100
GRASSES			
IDAHO FESCUE			
(Festuca idahoensis)	15	-	100
Sheep fescue			
(Festuca saximontant)	30	-	100
TIMOTHY			
(Phleum pratense)	10	-	100
CANADA BLUEGRASS			
(Poa compressa)	15	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBMESIC
NUTRIENT REGIME:
MESOTROPHIC
ELEVATION:
1488M
SOIL DRAINAGE:
WELL
ASPECT:
VARIABLE
SLOPE:
2%
ECOLOGICAL STATUS SCORE: 8

FORAGE PRODUCTION(KG/HA)

TOTAL: 1500

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0(1.2-0.5) HA/AUM
0.4(.33-0.8) AUM/AC

SUBALPINE SUBREGION

SOUTHERN ECODISTRICTS

FORESTED COMMUNITY TYPES

Figure 8. Deciduous communities are not common in the Subalpine, but where they do occur they can be very productive for domestic livestock. This picture represents an Aspen/Rose/Pinegrass dominated community, which can be common on warmer sites in the Subalpine subregion of southern Alberta.

SUBALPINE SUBREGION

FOREST ECOLOGY

The forested plant communities in the subalpine can be split into three zones. These include the Pine, Spruce-Fir and Upper Subalpine zones (Strong and Leggat 1992). The Pine zone is the lowest elevation zone and is dominated by lodgepole pine and shows little evidence of succession to Engelmann spruce. It is within this zone that aspen and balsam poplar dominated plant communities can occur on warmer sites. The Spruce-Fir zone is located altitudinally above the Pine zone (Strong and Leggat 1992). This zone displays evidence of lodgepole pine succession to Engelmann spruce and subalpine fir. The Upper subalpine zone is characterized by open canopied vegetation that occurs between the Spruce-Fir zone and timberline. This zone is dominated by dwarfed Engelmann spruce, alpine fir, whitebark pine and alpine larch. Plant growth in this upper zone is limited by low temperatures, wind, low moisture and a short growing season (Strong and Leggat 1992). There are only a handful of forested community types described in this guide. Archibald et al. (1996), provide a good descriptions of the major forested community types in the Subalpine subregion that are not represented in this guide. Generally, these forested plant communities only provide limited forage for domestic livestock, but where deciduous communities are extensive they can be heavily utilized by livestock and should be considered secondary range.

Table 6. Deciduous and conifer communities of the Southern Rocky Mountains of the Subalpine subregion

Community number	Community type	Productivity (kg/ha) Grass	Forb	Shrub	Total	Moisture	Drainage	Carrying capacity (ha/AUM)
a1	**lichen Pl**	**-**	**-**	**-**	**-**	**Submesic**	**Rapidly**	**3.0**
SASME1	Pl/Juniper	-	-	-	-	Submesic	Rapidly	3.0
e1	**false azalea-grouseberry Pl**	**199**	**444**	**121**	**727**	**Mesic**	**Well**	**4.5**
SASME2	Pl/Pinegrass	210	180	154	472	Mesic	Well	4.9
SASME3	Pl-Se/Moss	187	707	88	981	Mesic	Well	3.0
e3	**false azalea-grouseberry Se**				**155***	**Mesic**	**Well**	**5.9**
SASME4	Sw-Aw/Alder/Hairy wildrye				155*	Mesic	Well	5.9
e5	**deciduous**	**900**	**438**	**83**	**1388**	**Mesic**	**Well**	**1.5**
SASMD1	Pb/Silverberry	-	-	-	444*	Submesic	Rapidly	4.0
SASMD2	Aw/Rose/Pinegrass	641	535	113	1210	Mesic	Well	1.5
SASMD9	Aw/Rose/Marsh reedgrass	1208	292	64	1564	Mesic	Well	1.2
e5a	**grazed deciduous**	**1113**	**441**	**57**	**1611**	**Mesic**	**Well**	**1.5**
SASMD3	Aw/Fireweed/Meadow foxtail	1612	679	92	2383	Mesic	Well	1.0
SASMD4	Aw/Rose/Canada bluegrass	1036	348	78	1462	Submesic	Well	1.4
SASMD8	Aw/Kentucky bluegrass/Clover	692	296	-	988	Mesic	Well	1.5
f3	**thimbleberry Aw-Pb**	**585**	**796**	**350**	**1731**	**Subhygric**	**Well**	**1.3**
SASMD5	Aw-Pb/Cow parsnip	328	1200	92	1620	Subhygric	Well	1.3
SASMD7	Pb/Willow/Marsh reedgrass	842	392	608	1842	Subhygric	Well	1.1
f3a	**grazed thimbleberry Aw-Pb**	**328**	**1200**	**92**	**1620**	**Subhygric**	**Well**	**1.3**
SASMD6	Aw-Pb/Cow parsnip/Timothy	328	1200	92	1620	Subhygric	Well	1.3
i3	**treed fen**	**266**	**44**	**492**	**808**	**Subhygric**	**Poorly**	**40.0**
SASME5	Sw/Willow-Labrador tea	266	44	492	808	Subhygric	Poorly	40.0

*Estimate

SASMD1. Pb/Silverberry

(Populus balsamifera/Elaeagnus commutata)

n=1 This community type was described along the banks of Pekisko creek in the Pekisko Creek allotment. It is characteristic of dry gravelly, river flats, which are periodically flooded in the spring. This community type is very similar to the yellow mountain avens community which have been described in both the Montane and Subalpine subregions.

Generally, there is little forage for domestic livestock in this community type and it should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR *(Populus balsamifera)*	15	-	100
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	1	-	100
SILVERBERRY *(Elaeagnus commutata)*	5	-	100
SHRUBBY CINQUEFOIL *(Potentilla fruticosa)*	1	-	100
FALSE MOUNTAIN WILLOW *(Salix pseudomonticola)*	2	-	100
FORBS			
ALPINE HEDYSARUM *(Hedysarum alpinum)*	3	-	100
COMMON HORSETAIL *(Equisetum arvense)*	1	-	100
CUT-LEAVED ANEMONE *(Anemone multifida)*	1	-	100
GRACEFUL CINQUEFOIL *(Potentilla gracilis)*	1	-	100
GRASSES			
BLUE BUNCH WHEATGRASS *(Agropyron spicatum)*	1	-	100
JUNE GRASS *(Koeleria macrantha)*	1	-	100
CANADA BLUEGRASS *(Poa compressa)*	1	-	100
HAIRY WILD RYE *(Elymus innovatus)*	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBMESIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1828M

SOIL DRAINAGE :
RAPIDLY

SLOPE:
18%

ASPECT:
SOUTHEAST

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

TOTAL 444 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
4.0(4.0-2.0) HA/AUM OR
0.1(0.1-0.2) AUM/AC

SASMD2. Aw/Rose/Pinegrass

(Populus tremuloides/Rosa/Calamagrostis rubescens)

n=29 This community type is similar to the Aw/Rose/Pinegrass community which is described on mesic sites with medium nutrient regimes in the Montane subregion. It may represent the transition from the Montane to the Subalpine. These sites were described at lower elevations in the Subalpine and generally had southerly aspects, making the conditions more suitable for growing aspen. The forage productivity on this community type is moderate and it should be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN *(Populus tremuloides)*	42	20-80	100
WHITE SPRUCE *(Picea glauca)*	2	0-5	44
BALSAM POPULAR *(Populus balsamifera)*	2	0-15	21
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	7	1-28	100
SNOWBERRY *(Symphoricarpos albus)*	2	0-5	49
WHITE MEADOWSWEET *(Spiraea betulifolia)*	3	0-31	45
WILD RED RASPBERRY *(Rubus idaeus)*	1	0-8	38
FORBS			
WILD VETCH *(Vicia americana)*	4	1-23	100
CREAM COLORED VETCHLING *(Lathyrus ochroleucus)*	6	0-17	97
WILD STRAWBERRY *(Fragaria virginiana)*	5	0-11	97
SHOWY ASTER *(Aster conspicuus)*	4	0-24	76
COMMON FIREWEED *(Epilobium angustifolium)*	5	0-24	83
COMMON DANDELION *(Taraxacum officinale)*	1	0-5	59
WESTERN CANADIAN VIOLET *(Viola canadensis)*	2	0-10	21
GRASSES			
PINEGRASS *(Calamagrostis rubescens)*	14	3-32	100
HAIRY WILDRYE *(Elymus innovatus)*	6	0-14	86

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBMESIC TO SUBHYGRIC
NUTRIENT REGIME :
MESOTROPHIC
ELEVATION:
1608(1400-1768)M
SOIL DRAINAGE :
WELL TO IMPERFECTLY
SLOPE:
15(6-30)%
ASPECT:
SOUTHERLY
ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

GRASS	641(160-1512)
FORB	535(44-1151)
SHRUB	113(0-726)
TOTAL	1210(416-2034)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.5 (4.4-0.9) HA/AUM
0.27 (0.09-0.45) AUM/AC

SASMD3. Aw/Fireweed/Meadow foxtail

(Populus tremuloides/Epilobium angustifolium/Alopecurus pratensis)

n=1 This community type was described in the South Sheep allotment on an old range improvement area. Many aspen stands in the South Sheep were cleared and seeded to mixture of brome, meadow foxtail, creeping red fescue and clover. This site represents invasion of aspen back into these range improvement areas. Meadow foxtail is generally unpalatable to livestock and has persisted on these sites.

This community is very productive and efforts should be made to control the aspen invasion.

PLANT COMPOSITION

	CANOPY COVER(%)		
	MEAN	RANGE	CONST.
TREES			
ASPEN *(Populus tremuloides)*	36	-	100
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	8	-	100
PIN CHERRY *(Prunus pensylvanica)*	1	-	100
FORBS			
COMMON FIREWEED *(Epilobium angustifolium)*	12	-	100
STICKY PURPLE GERANIUM *(Geranium viscosissimum)*	8	-	100
LINDLEY'S ASTER *(Aster ciliolatus)*	4	-	100
COMMON VETCH *(Vicia americana)*	3	-	100
CREAM COLORED VETCHLING *(Lathyrus ochroleucus)*	2	-	100
GRASSES			
MEADOW FOXTAIL *(Alopecurus pratensis)*	32	-	100
ORCHARDGRASS *(Dactylis glomerata)*	17	-	100
KENTUCKY BLUEGRASS *(Poa pratensis)*	3	-	100
TIMOTHY *(Phleum pratense)*	7	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC TO SUBHYGRIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1400M

SOIL DRAINAGE :
WELL

SLOPE:
10%

ASPECT:
SOUTHWEST

ECOLOGICAL STATUS SCORE: TAME PASTURE

FORAGE PRODUCTION KG/HA

GRASS	1612
FORB	679
SHRUB	92
TOTAL	2383

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.0(1.5-0.8) HA/AUM or
0.4(0.26-0.5) AUM/AC

SASMD4. Aw/Rose/Canada bluegrass

(Populus tremuloides/Rosa spp./Poa compressa)

n=1 This community type represents a Aw/Rose/Pinegrass community that has been heavily grazed and invaded by Canada bluegrass. Canada bluegrass is an introduced grass that increases with increased grazing pressure. As grazing pressure increases in these aspen dominated community types there is a shift away from native species (rose, pinegrass, asters, fireweed) to a community that is dominated by bluegrass, timothy, dandelion and clover species. The invasion of non-native invaders onto the site makes this community very productive for domestic livestock, but the presence of overgrazed communities indicates some type of distribution problem and the management of the disposition should be discussed.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
(Populus tremuloides)	35	-	100
WHITE SPRUCE			
(Picea glauca)	5	-	100
SHRUBS			
PRICKLY ROSE			
(Rosa acicularis)	4	-	100
WILD RED RASPBERRY			
(Rubus idaeus)	10	-	100
NORTHERN GOOSEBERRY			
(Ribes oxyacanthoides)	1	-	100
FORBS			
LINDLEY'S ASTER			
(Aster ciliolatus)	22	-	100
WILD STRAWBERRY			
(Fragaria virginiana)	6	-	100
COMMON DANDYLION			
(Taraxacum officinal)	5	-	100
COMMON FIREWEED			
(Epilobium angustifolium)	4	-	100
CREAM COLORED VETCHLING			
(Lathyrus ochroleucus)	4	-	100
GRASSES			
CANADA BLUEGRASS			
(Poa compressa)	30	-	100
PINE REEDGRASS			
(Calamagrostis rubescens)	9	-	100
HAIRY WILDRYE			
(Elymus innovatus)	9	-	100
AWNLESS BROME			
(Bromus inermis)	2	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBMESIC
NUTRIENT REGIME :
MESOTROPHIC
ELEVATION:
1420M
SOIL DRAINAGE :
WELL
SLOPE:
10%
ASPECT:
SOUTHWEST
ECOLOGICAL STATUS SCORE: 6

FORAGE PRODUCTION KG/HA

GRASS	1036
FORB	348
SHRUB	78
TOTAL	1462

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.4(1.8-1.2) HA/AUM or
0.28(0.22-0.33) AUM/AC

SASMD5. Aw-Pb/Cow parsnip

(Populus tremuloides-Populus balsamifera/Heracleum lanatum)

n=3 Nutrient seepage occurs at some point in the growing season favouring the growth of cow parsnip. This community type is very similar to the Aw/Thimbleberry community described in the Montane subregion. Forage productivity on these sites is generally quite hig because of the favourable moisture and nutrient conditions. Cow parsnip is palatable to livestock and maybe extensively utilized. This community type should be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
(Populus tremuloides)	17	0-30	67
BALSAM POPLAR			
(Populus balsamifera)	18	10-30	100
SHRUBS			
WILD RED RASPBERRY			
(Rubus idaeus)	1	0-1	67
NORTHERN GOOSEBERRY			
(Ribes oxyacanthoides)	2	0-5	33
FORBS			
CREAM COLORED VETCHLING			
(Lathyrus ochroleucus)	5	1-13	100
COW PARSNIP			
(Heracleum lanatum)	31	8-48	100
LINDLEY'S ASTER			
(Aster ciliolatus)	22	20-24	100
WESTERNCANADA VIOLET			
(Viola canadensis)	6	1-15	100
TALL LUNGWORT			
(Mertensia paniculata)	5	1-12	100
TALL LARKSPUR			
(Delphinium glaucum)	5	1-11	100
COMMON FIREWEED			
(Epilobium angustifolium)	4	3-5	100
COMMON DANDYLION			
(Taraxacum officinale)	2	1-2	100
GRASSES			
MARSH REEDGRASS			
(Calamagrostis canadensis)	4	0-7	67
HAIRY WILDRYE			
(Elymus innovatus)	2	1-2	100
AWNLESS BROME			
(Bromus inermis)	2	1-5	100
TIMOTHY			
(Phleum pratense)	2	1-3	100
SEDGE			
(Carex spp.)	1	1-2	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYGRIC
NUTRIENT REGIME :
MESOTROPHIC-PERMESOTROPHIC
ELEVATION:
1400M
SOIL DRAINAGE :
WELL
SLOPE:
8%
ASPECT:
SOUTHWEST
ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

GRASS	328
FORB	1200
SHRUB	92
TOTAL	1620

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.3(2.0-1.0) HA/AUM OR
0.31(0.2-0.4) AUM/AC

SASMD6. Aw-Pb/Cow parsnip/Timothy

(Populus tremuloides-Populus balsamifera/Heracleum lanatum/Phleum pratense)

n=1 Nutrient seepage occurs at some point in the growing season favouring the growth of cow parsnip. This community type is very similar to the previously described Aw-Pb/Cow parsnip community, but this community has a high cover of timothy. Increased grazing pressure will often allow timothy, Kentucky bluegrass and dandelion to invade onto these sites. Forage productivity on these sites is generally quite high because of the favourable moisture and nutrient conditions. Cow parsnip is palatable to livestock and maybe extensively utilized. This community type should be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN *(Populus tremuloides)*	26	-	100
BALSAM POPLAR *(Populus balsamifera)*	16	-	100
SHRUBS			
WILD RED RASPBERRY *(Rubus idaeus)*	4	-	100
FORBS			
CREAM COLORED VETCHLING *(Lathyrus ochroleucus)*	2	-	100
COW PARSNIP *(Heracleum lanatum)*	2	-	100
LINDLEY'S ASTER *(Aster ciliolatus)*	18	-	100
WESTERNCANADA VIOLET *(Viola canadensis)*	2	-	100
TALL LUNGWORT *(Mertensia paniculata)*	1	-	100
WESTERN MEADOW RUE *(Thalictrum occidentalis)*	4	-	100
COMMON FIREWEED *(Epilobium angustifolium)*	1	-	100
COMMON DANDELION *(Taraxacum officinale)*	6	-	100
GRASSES			
MARSH REEDGRASS *(Calamagrostis rubescens)*	4	-	100
SMOOTH WILDRYE *(Elymus glaucus)*	7	-	100
AWNLESS BROME *(Bromus inermis)*	2	-	100
TIMOTHY *(Phleum pratense)*	18	-	100
SEDGE *(Carex spp.)*	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYGRIC

NUTRIENT REGIME :
PERMESOTROPHIC

ELEVATION:
1510M
SOIL DRAINAGE :
MOD. WELL
SLOPE:
10%
ASPECT:
VARIABLE
ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION KG/HA

GRASS	328
FORB	1200
SHRUB	92
TOTAL	1620

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.4(2.0-1.0)HA/AUM OR
0.28(0.2-0.4) AUM/AC

SASMD7. Balsam poplar/ Willow/ Marsh reedgrass

(Populus balsamifera/ Salix spp/ Calamagrostis canadensis)

n=1 This community type was described on the flood plain adjacent to a creek. This community is not common in the Subalpine subregion and likely represents the continued succession of a willow dominated community type. Continued succession in the absence of disturbance will likely lead to the development of a spruce dominated community type.

. When in close proximity to primary range areas this community type should be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR *(Populus balsamifera)*	20	-	100
LODGEPOLE PINE *(Pinus contorta)*	4	-	100
SHRUBS			
BOG BIRCH *(Betula glandulosa)*	2	-	100
WILLOW *(Salix spp.)*	13	-	100
FORBS			
HORSETAIL *(Equisetum arvense)*	3	-	100
LINDLEY'S ASTER *(Aster ciliolatus)*	13	-	100
RICHARDSON GERANIUM *(Geranium richardsonii)*	6	-	100
FIREWEED *(Epilobium angustifolium)*	3	-	100
STRAWBERRY *(Fragaria virginiana)*	3	-	100
GRASSES			
MARSH REEDGRASS *(Calamagrostis canadensis)*	15	-	100
KENTUCKY BLUEGRASS *(Poa pratensis)*	4	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
PERMESOTROPHIC
ELEVATION:
1656 M
SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS:	842
FORBS:	392
SHRUBS:	608
TOTAL:	1842

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.1(2.0-1.0) HA/AUM OR
0.36(0.2-0.4) AUM/AC

SASMD8. Aw/Kentucky bluegrass/Clover

(Populus tremuloides/Poa pratensis/Trifolium spp.)

n=1 This community type is representative of an Aw/Rose/Pinegrass or Marsh reedgrass community type that has recieved prolonged heavy grazing. This type often occurs in relatively small isolated patches created by intensive grazing adjacent to water, salt or temporary holding areas. The species richness and diversity of native grass, forbs and shrubs is reduced and replaced by grazing resistant clover, dandelion and Kentucky bluegrass. This community type would be rated as unhealthy and distribution of livestock throughout the disposition should be examined.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN *(Populus tremuloides)*	61	-	100
WHITE SPRUCE *(Picea glauca)*	1	-	100
SHRUBS			
ROSE (*Rosa acicularis*)	3	-	100
BRISTLY BLACK CURRANT (*Ribes lacustre.)*	2	-	100
FORBS			
CLOVER (*Trifolium repens)*	27	-	100
LINDLEY'S ASTER *(Aster ciliolatus)*	10	-	100
DANDELION *(Taraxacum officinale)*	5	-	100
BUNCHBERRY (*Cornus canadensis)*	2	-	100
STRAWBERRY *(Fragaria virginiana)*	5	-	100
GRASSES			
MARSH REEDGRASS *(Calamagrostis canadensis)*	16	-	100
KENTUCKY BLUEGRASS (*Poa pratensis*)	14	-	100
TIMOTHY (*Phleum pratense*)	10	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC
NUTRIENT REGIME:
MESOTROPHIC
ELEVATION:
1410 M
SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 0

FORAGE PRODUCTION(KG/HA)

GRASS:	692
FORBS:	296
SHRUBS:	-
TOTAL:	988

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.5 (1.9-1.3)HA/AUM OR
0.26(0.21-0.3) AUM/AC

SASMD9. Aw/Rose/Marsh reedgrass

(Populus tremuloides/Rosa acicularis/ Calamagrostis canadensis)

n=1 This community type is similar to the Aw/Rose/Pinegrass dominated community type, but occupies slightly moister sites which favours the growth of marsh reedgrass over pinegrass. Marsh reedgrass is not common in the Subalpine or the lower Montane subregions and the presence of this species likely indicates a boreal climatic influence on the site. This community type has a low shrub cover and extensive cover of grass which makes it fairly attractive to livestock. In the northern half of the province this community type is often heavily utilized.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN *(Populus tremuloides)*	65	-	100
WHITE SPRUCE *(Picea glauca)*	7	-	100
SHRUBS			
ROSE (*Rosa acicularis*)	9	-	100
SNOWBERRY (*Symphoricarpos occidentalis)*	3	-	100
FORBS			
RICHARDSON'S GERANIUM (*Geranium richardsonii)*	8	-	100
LINDLEY'S ASTER *(Aster ciliolatus)*	6	-	100
YELLOW PEAVINE *(Lathyrus ochroleucus)*	8	-	100
VEINY MEADOW RUE (*Thalictrum venulosum)*	7	-	100
SHOWY ASTER *(Aster conspicuus)*	5	-	100
GRASSES			
MARSH REEDGRASS *(Calamagrostis canadensis)*	23	-	100
SLENDER WHEATGRASS (*Agropyron trachycaulum*)	7	-	100
HAIRY WILDRYE (*Elymus innovatus*)	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
MESOTROPHIC
ELEVATION:
1400 M
SOIL DRAINAGE:
WELL
SLOPE: 20%
ASPECT: WESTERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS: 1208
FORBS: 292
SHRUBS: 64
TOTAL: 1564

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.3 (4.0-1.0)HA/AUM OR
0.1(0.1-0.4) AUM/AC

SASMD10. Aw/Bearberry-Juniper

(Populus tremuloides/Arctostaphylos uva-ursi-Juniperus horizontalis)

n=1 This community type occupies dry, upper slope and hilltop positions and represents the invasion of aspen onto a Juniper, Bearberry-dominated grassland. The soils on this community type are fairly well developed and the moisture conditions are high enough to favour the growth of aspen. In years of drought aspen will likely die back in this community type. Frequent fire also tends to control the spread of aspen onto these shrub dominated grasslands. The lack of fire in the last 50 years has allowed many of these grasslands to be invaded by aspen.

PLANT COMPOSITION CANOPY COVER(%)

	Mean	Range	Const.
Trees			
Aspen *(Populus tremuloides)*	8	-	100
Lodgepole pine *(Pinus contorta)*	5	-	100
Shrubs			
Canada buffaloberry (*Shepherdia canadensis*)	8	-	100
Creeping juniper (*Juniperus horizontalis)*	5	-	100
Forbs			
Bearberry (*Arctostaphylos uva-ursi)*	40	-	100
Yellow hedysarum *(Hedysarum sulphurescens)*	1	-	100
Small leaved everlasting *(Antennaria parviflora)*	5	-	100
Early yellow locoweed (*Oxytropis sericea)*	6	-	100
Low goldenrod *(Solidago missouriensis)*	3	-	100
Grasses			
Sedge *(Carex spp)*	5	-	100
Slender wheatgrass (*Agropyron trachycaulum*)	6	-	100
Junegrass (*Koeleria macrantha*)	7	-	100
Sheep fescue (*Festuca saximontana*)	2	-	100

ENVIRONMENTAL VARIABLES

Moisture Regime:
Subxeric-Submesic
Nutrient Regime:
Submesotrophic
Elevation:
1710 m
Soil Drainage:
well
Slope: 16-30%
Aspect: Southwesterly

Ecological status score: 18

FORAGE PRODUCTION(KG/HA)

Grass:	1208
Forbs:	292
Shrubs:	64
Total:	1564

Ecologically sustainable Stocking rate
2.5 (4.0-2.0)ha/aum or
0.18(0.1-0.2) AUM/AC

SASME1. Pl/Juniper

(Pinus contorta/Juniperus spp.)

n=1 Dry site conditions from south exposures or coarse textured soils are characteristic of this community type (Archibald et al. 1996). The dry site conditions limit the amount of forage this site can produce and the steep slope limits access to livestock. As a result, this community would be considered non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LODGEPOLE PINE *(Pinus contorta)*	15	-	100
SHRUBS			
GROUND JUNIPER *(Juniperus communis)*	15	-	100
CREEPING JUNIPER *(Juniperus horizontalis)*	2	-	100
CANADA BUFFALOBERRY *(Shepherdia canadensis)*	6	-	100
PRICKLY ROSE *(Rosa acicularis)*	3	-	100
CHOKE CHERRY *(Prunus virginiana)*	2	-	100
FORBS			
YELLOW HEDYSARUM *(Hedysarum sulphurescens)*	3	-	100
BEARBERRY *(Arctostaphylos uva-ursi)*	8	-	100
SPREADING DOGBANE *(Apocynum androsaemifolium)*	15	-	100
LINDLEY'S ASTER *(Aster ciliolatus)*	1	-	100
GRASSES			
HAIRY WILD RYE *(Elymus innovatus)*	1	-	100
SEDGE *(Carex spp.)*	T	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBMESIC

NUTRIENT REGIME :
OLIGOTROPHIC

ELEVATION:
1659M

SOIL DRAINAGE :
RAPIDLY

SLOPE:
22%

ASPECT:
SOUTH

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

TOTAL 350 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
3.0(40.0-2.6) HA/AUM OR
0.13(.01-0.15) AUM/AC

SASME2. Pl/Pinegrass

(Pinus contorta/Calamagrostis rubescens)

n=1 This community type is very similar to the Pl/Pinegrass dominated community described in the Montane subregion (Willoughby et al. 2005). Succession will be to white spruce, but the extensive fire history in the area has resulted in a predominance of lodgepole pine (Archibald et al 1996). Pinegrass is generally unpalatable to livestock, but if grazed early in the spring they will utilize it as a forage source. The forage productivity of this community type is quite low. As a result this community type should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LODGEPOLE PINE *(Pinus contorta)*	60	35-70	100
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	2	0-3	75
WHITE MEADOWSWEET *(Spiraea betulifolia)*	6	0-10	75
DWARF BILBERRY *(Vaccinium caespitosum)*	10	0-19	75
GROUND JUNIPER *(Juniperus communis)*	1	0-4	50
FORBS			
TWINFLOWER *(Linneae borealis)*	3	0-5	75
SHOWY ASTER *(Aster conspicuus)*	1	0-2	75
CREAM COLORED VETCHLING *(Lathyrus ochroleucus)*	1	1-2	75
WILD STRAWBERRY *(Fragaria virginiana)*	1	1-2	100
HEART-LEAVED ARNICA *(Arnica cordifolia)*	1	0-3	75
WINTERGREEN *(Pyrola asarifolia)*	1	1-2	100
GRASSES			
PINEGRASS *(Calamagrostis rubescens)*	8	1-27	100
HAIRY WILDRYE *(Elymus innovatus)*	4	1-4	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC-SUBMESIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1665(1618-1730)M

SOIL DRAINAGE :
WELL

SLOPE:
10(5-15)%

ASPECT:
VARIABLE

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

GRASS	179(34-398)
FORB	111(92-122)
SHRUB	81(0-154)
TOTAL	374(166-660)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
4.9 (11-2.8) HA/AUM OR
0.08 (0.04-0.14) AUM/AC

SASME3. Pl-Se/Moss

(Pinus contorta-Picea engelmannii/Moss spp.)

n=5 This community type represents the modal conditions for the Subalpine subregion at mid to lower elevations. Lodgepole pine, Engelmann spruce and subalpine fir can all occur as the dominant tree species on this ecological site. In general succession is from lodgepole pine to Engelmann spruce and subalpine fir. However, lodgepole pine is the most common tree species because of the frequency of fire.

There is little forage for domestic livestock in this community type. As a result, this community should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ENGELMANN SPRUCE *(Picea engelmannii)*	3	0-10	40
WHITE SPRUCE *(Picea glauca)*	2	0-10	20
LODGEPOLE PINE *(Pinus contorta)*	30	15-60	100
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	1	0-1	80
DWARF BILBERRY *(Vaccinium caespitosum)*	2	1-3	100
WHITE MEADOWSWEET *(Spiraea betulifolia)*	2	0-5	80
GREEN ALDER *(Alnus crispa)*	3	0-8	40
FORBS			
BUNCHBERRY *(Cornus canadensis)*	8	1-14	100
WILD STRAWBERRY *(Fragaria virginiana)*	2	1-4	100
SHOWY ASTER *(Aster conspicuus)*	2	0-3	80
TWINFLOWER *(Linnaea borealis)*	2	0-6	80
BROAD-LEAVED ARNICA *(Arnica latifolia)*	1	0-4	40
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	1	0-1	80
PINEGRASS *(Calamagrostis rubescens)*	3	0-5	60
RICHARDSON NEEDLEGRASS *(Stipa richardsonii)*	T	0-1	20
MOSS			
(Moss spp)	10	1-38	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
XERIC TO MESIC
NUTRIENT REGIME :
SUBMESOTROPHIC TO MESOTROPHIC
ELEVATION:
1647(1536-1770)M
SOIL DRAINAGE : RAPIDLY TO WELL
SLOPE: 9(0-22)%
ASPECT: VARIABLE
ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

GRASS	187
FORB	707
SHRUB	88
TOTAL	981

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
3.0(40.0-2.0) HA/AUM OR
0.13(0.01-0.2) AUM/AC

SASME4. Sw-Aw/Alder/Hairy wildrye

(Picea glauca-Populus tremuloides/Alnus crispa/Elymus innovatus)

n=1 This community type represents the succession of spruce onto an aspen dominated community type. As succession occurs from aspen to spruce there is a corresponding drop in forage production. This community type has little forage available for domestic livestock and should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE *(Picea glauca)*	31	-	100
ASPEN (*Populus tremuloides*)	16	-	100
LODGEPOLE PINE (*Pinus contorta*)	3	-	100
SHRUBS			
PRICKLY ROSE *(Rosa acicularis)*	3	-	100
DWARF BILBERRY *(Vaccinium caespitosum)*	3	-	100
WHITE MEADOWSWEET *(Spiraea betulifolia)*	5	-	100
GREEN ALDER *(Alnus crispa)*	10	-	100
FORBS			
ONE SIDED WINTERGREEN *(Orthilia secunda)*	2	-	100
SHOWY ASTER *(Aster conspicuus)*	2	-	100
TWINFLOWER *(Linnaea borealis)*	1	-	100
GRASSES			
HAIRY WILDRYE *(Elymus innovatus)*	3	-	100
PINEGRASS *(Calamagrostis rubescens)*	3	-	100
MOSS			
(*Moss spp*)	10	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1557M

SOIL DRAINAGE : WELL

SLOPE: 22%
ASPECT: NORTHERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

TOTAL 155

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
5.9(40.0-4.0) HA/AUM OR
0.06(.01-0.1) AUM/AC

SASME5. Sw/Willow-Labrador tea

(Picea glauca/Salix spp.-Ledum groenlandicum)

n=1 This community type is characteristic of the rich fen ecosite which is characterized by flowing oxygenated water and alkaline nutrient rich conditions. However, the presence of a high cover of Labrador tea and small bog cranberry indicate this site is somewhat acidic and is tending towards the conditions of the bog ecosite. The bog ecosite tends to be rare in the Subalpine because the higher relief tends to facilitate water movement, which probably explains the transition between the conditions of the two ecosites. The wet conditions of this community type limits livestock accessibility. This community type should be rated non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE			
(Picea glauca)	35	-	100
SHRUBS			
WILLOW			
(Salix spp.)	19	-	100
BOG BIRCH			
(Betula glandulosa)	12	-	100
LABRADOR TEA			
(Ledum groenlandicum)	20	-	100
FORBS			
SMALL BOG CRANBERRY			
(Oxycoccus microcarpos)	12	-	100
TWINFLOWER			
(Linnaea borealis)	6	-	100
MITREWORT			
(Mitella nuda)	2	-	100
GRASSES			
SEDGE			
(Carex spp)	5	-	100
BALTIC RUSH			
(Juncus balticus)	2	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
SUBHYDRIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1742M

SOIL DRAINAGE : POORLY

SLOPE: 15%

ASPECT: NORTHERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION KG/HA

GRASS	266
FORB	44
SHRUB	492
TOTAL	802

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.0(40.0-2.0) HA/AUM
.01(.01-0.2) AUM/AC

SUBALPINE CUTBLOCKS

Cutblocks in the subalpine are common, but generally the areas of the subalpine where cutblocks do occur are not accessible to livestock. Where cutblocks do occur adjacent to grazing areas they can be an important source of forage for domestic livestock. They can produce on average twice as much as deciduous stands and nearly three times more that conifer stands. It must be remembered that this increase in production is only temporary. As the cutblock undergoes succession there will be a corresponding drop in forage production. Increases carrying capacity after harvesting can be acquired through a temporary permit.

It must be remembered that maximum forage productivity does not occur on a cutblock until it is approximately 3 years old. One year old cutblocks will generally have less than half the total production of a 3 year old block.

Table 7. Cutblock communities of the Southern Rocky Mountains of the Subalpine subregion

Community number	Community type	Productivity (kg/ha) Grass	Forb	Shrub	Total	Moisture	Drainage	Carrying capacity (ha/AUM)
e3	**false azalea-grouseberry/Se**	-	-	-	**600***	**Mesic**	**Well**	**3.0**
SASMF1	Pinegrass/Fireweed/Sw	-	-	-	600*	Mesic	Well	3.0

*Estimate

SASMF1. Pinegrass/Fireweed/Sw

(Calamagrostis rubescens/Epilobium angustifolium/Picea glauca)

n=1 This community type represents the early successional community of a spruce dominated forest that has been harvested. As succession occurs back to spruce there will be a corresponding drop in forage production. This community type has little forage available for domestic livestock and should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE			
(Picea glauca)	2	-	100
SHRUBS			
PRICKLY ROSE			
(Rosa acicularis)	3	-	100
WHITE MEADOWSWEET			
(Spiraea betulifolia)	10	-	100
GREEN ALDER			
(Alnus crispa)	5	-	100
FORBS			
FIREWEED			
(Epilobium angustifolium	14	-	100
PEAVINE			
(Lathyrus ochroleucus)	2	-	100
BUNCHBERRY			
(Cornus canadensis)	5	-	100
GRASSES			
HAIRY WILDRYE			
(Elymus innovatus)	10	-	100
PINEGRASS			
(Calamagrostis rubescens)	10	-	100
MOSS			
(*Moss spp*)	10	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME :
MESIC

NUTRIENT REGIME :
MESOTROPHIC

ELEVATION:
1440M

SOIL DRAINAGE : WELL

SLOPE: 20%
ASPECT: EASTERLY
HEALTH RATING:
HEALTHY

FORAGE PRODUCTION KG/HA

TOTAL 600*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
3.0(40.0-2.0) HA/AUM
0.13(0.01-0.2) AUM/AC

ALPINE SUBREGION

NATIVE GRASSLANDS AND SHRUBLANDS

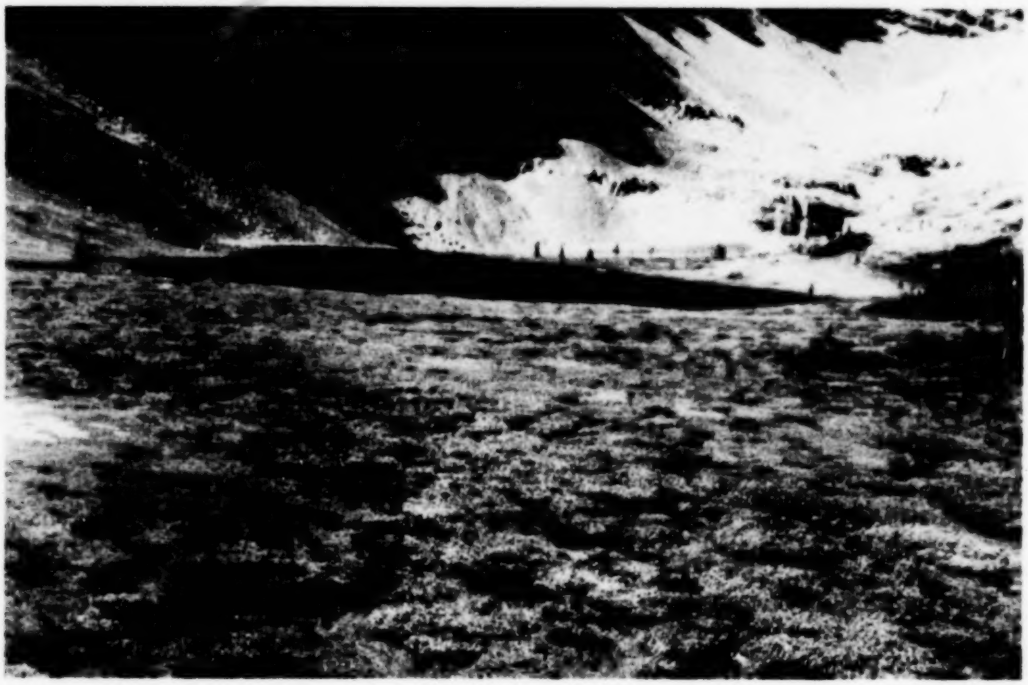


Figure 9. Low growing plant communities of white mountain avens and bog sedge on windswept ridges, with arctic willow, heather and blackening sedge in snow accumulation areas are typical of the Alpine subregion

Alpine communities

The alpine environment generally occurs above timberline. Ogilvie (1969), found timberline to be controlled by low temperature, wind dessication, avalanching and snow depth. The alpine plants and communities show adaptations to these extreme environmental conditions. The alpine plant communities tend to be low growing where they are protected from the wind and benefit from the warmer temperatures close to the ground (Ogilvie 1969). Figure 4 outlines the alpine communities in the landscape of the Rocky Mountains. On south facing, wind swept ridges the bog sedge and white dryad communities are found. At slightly lower elevations where snow accumulates the low growing willow communities predominate (arctic willow, snow willow, rock willow). On the north facing slopes where snow accumulates the blackening sedge and heather community types are found. In the valley bottoms below timberline the willow, bog birch, and grassy meadow community types are typical. The sequence of the valley bottom community types in the landscape is described in Figure 3. The ecological sites, ecological site phases and plant community types found in the Alpine subregion are listed in Tables 7 and 8.

Many of these alpine grass and shrublands are very fragile because of exposure and cold climate. The forage productivity is very low compared to the valley bottoms. Consequently, recovery from overgrazing will likely take some time. As a result grazing by domestic livestock in the Alpine subregion should be discouraged.

Table 8. Ecological site, ecological site phases and community types for the Alpine subregion(adapted from Beckingham et al. 1996).

Ecological Site	Ecological Site Phase	Reference Range Plant Community	Successional Community Types
a lichen stone fields (subxeric/very poor)	a1 lichen	ALPA7 Lichen	
b mountain avens-bog sedge (submesic/poor)	b1 bog sedge	ALPA1 Bog sedge	
	b2 mountain avens	ALPA2 White mountain avens	
c heather (mesic/medium)	c1 heather	ALPA3 Mountain heather	
d snowpatch seepages (subhygric/medium)	d1 blackening sedge	ALPA4 Blackening sedge	
	d2 simple bog sedge	ALPA5 Simple bog sedge	
	d3 arctic willow	ALPA6 Arctic willow	

a lichen stone fields (n=6)

GENERAL DESCRIPTION

This ecosite occurs on subxeric to xeric Alpine sites at elevations from 2400-2800 m on various slopes and aspects. The soils are Orthic Regosols or non-soil occurring on Rockland or Colluvial Rubble. This ecosite is only sparsely vegetated with less than 20% plant cover with lichens contributing to most of the cover

SUCCESSIONAL RELATIONSHIPS

This ecosite is characteristic of weakly or non-calcareous sites and is successionally mature.

INDICATOR SPECIES

sedge
lichen

subxeric/medium

SITE CHARACTERISTICS

Moisture regime: subxeric, xeric
Nutrient regime: very poor
Topographic position: crest, upper slope
Slope: 3-70%
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: very rapidl
Parent material: C, R
Soil subgroup:, O.R

ECOSITE PHASES

a1 lichen (n=6)

a1 lichen (n=6)

CHARACTERISTIC SPECIES

Shrubs

[1]	Willow

Forbs

[1]	Inflated oxytrope
[1]	Moss campion

Graminoids

[1]	Sedge

Lichen

[7]	Lichen

SITE CHARACTERISTICS

Moisture regime: subxeric, xeric
Nutrient regime: very poor
Topographic position: crest, upper slope
Slope: (0-70)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley:
Drainage: very rapid
Parent material: C, R
Soil subgroup:, O.R

COMMUNITY TYPES

ALPA7. Lichen (n=6)

b mountain avens-bog sedge (n=48)

GENERAL DESCRIPTION

This ecosite occurs on south and west facing windswept ridges throughout the mountains. The soils are well drained Orthic Regosols, Orthic Humic Regosols, or Orthic Melanic, Orthic Sombric and Orthic Eutric Brunisols. Turbic and Lithic soil phases are common (Corns and Achuff 1982). The landforms are predominantly morainal and colluvial.

SUCCESSIONAL RELATIONSHIPS

This ecosite is successionally mature

INDICATOR SPECIES

white mountain heather
northern white mountain avens
white mountain avens
hairy wildrye
bog sedge

submesic/poor

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic, mesic
Nutrient regime: very poor, poor
Topographic position: crest and upper slope
Slope: (0-70)
Aspect: southerly, westerly

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: very rapidly, well
Parent material: C, M
Soil subgroup:, O.R, O.HR, O.MB, O.EB, O.SB

ECOSITE PHASES

b1 bog sedge(n=5)
b2 mountain avens (n=43)

b1 bog sedge (n=5)

CHARACTERISTIC SPECIES

Shrubs

[3]	Smooth willow
[3]	Bog birch

Forbs

[2]	Northern white mtn. avens
[2]	White mtn. avens
[5]	Alpine hedysarum

Graminoids

[44]	Bog sedge
[4]	Hairy wildrye

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic, mesic
Nutrient regime: very poor, poor
Topographic position: crest and upper slope
Slope: (0-70)
Aspect: southerly, westerly

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: very rapidly, well
Parent material: C, M
Soil subgroup:, O.R, O.HR, O.MB, O.EB, O.SB

COMMUNITY TYPES

ALPA1 Bog sedge(n=5)

b2 mountain avens (n=43)

CHARACTERISTIC SPECIES

Shrubs

[2]	Snow willow

Forbs

[16]	Northern white mtn. avens
[17]	White mtn. avens
[3]	White mountain heather
[1]	Moss campion
[1]	Prairie selaginella

Graminoids

[3]	Bog sedge
[1]	Hairy wildrye

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic, mesic
Nutrient regime: very poor, poor
Topographic position: crest and upper slope
Slope: (0-70)
Aspect: southerly, westerly

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: very rapidly, well
Parent material: C, M
Soil subgroup:, O.R, O.HR, O.MB, O.EB, O.SB

COMMUNITY TYPES

ALPA2 White Mountain Avens (n=43)

c1 heather (n=58)

c **heather** (n=58)

GENERAL DESCRIPTION

This ecosite occurs on mesic, level to steeply sloping sites of various aspects at elevations from 2000 to 2500 m. Soils are well to moderately developed well drained Eutric and Dystric Brunisols, Orthic Humo-Ferric Podzols and Melanic and Sombric Brunisols developed on morainal and residual landforms.

SUCCESSIONAL RELATIONSHIPS

This ecosite is successionally mature

INDICATOR SPECIES

western mountain-heather
white mountain heather
red heather
yellow heather
willow

mesic/medium

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: crest and upper slope
Slope: (0-70)
Aspect: northerly

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: well
Parent material: C,R
Soil subgroup:, O.HFP, O.DYB, O.MB, O.EB, O.SB

ECOSITE PHASES

c1 heather (n=58)

CHARACTERISTIC SPECIES

Shrubs

[13]	willow

Forbs

[27]	Western mountain heather
[5]	Red heather
[1]	White mountain heather
[20]	Yellow heather
[1]	Western anemone
[1]	Woolly everlasting

Graminoids

[1]	Sedge

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: crest and upper slope
Slope: (0-70)
Aspect: northerly

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: well
Parent material: C,R
Soil subgroup:, O.HFP, O.DYB, O.MB, O.EB, O.SB

COMMUNITY TYPES

ALPA3 Mountain heather (n=58)

d snowpatch seepages (n=28)

GENERAL DESCRIPTION

This ecosite occupies well to imperfectly drained sites with mesic to subhygric moisture regimes. It occurs on a variety of slopes and aspects. Soils vary from Humic Regosols, Dystric Brunisols, Gleysols, Sombric Brunisols and Humo-Ferric Podzols and occupies morainal and fluvial landforms(Corns and Achuff 1982). This ecosite occurs in deep snow accumulation areas and often recieves seepage for much of the growing season.

SUCCESSIONAL RELATIONSHIPS

This ecosite is successionally mature

INDICATOR SPECIES

woolly everlasting
blackening sedge
simple bog sedge
arctic willow

subhygric/medium

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium
Topographic position: lower slope, toe, depression
Slope: (0-45)
Aspect: northerly, variable

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: well, moderately well, Imperfect
Parent material: FL, M
Soil subgroup:, O.HFP, O.DYB, O.HR, O.SB

ECOSITE PHASES

d1 blackening sedge (n=5)
d2 simple bog sedge (n=1)
d3 arctic willow (n=20)

d1 blackening sedge (n=5)

CHARACTERISTIC SPECIES

Forbs

[1]	Mountain buttercup
[7]	Mountain marsh marigold
[6]	Woolly everlasting

Graminoids

[49]	black alpine sedge
[4]	tufted hairgrass
[2]	mountain wood rush
[4]	mountain hair grass

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium
Topographic position: lower slope, toe, depression
Slope: (0-45)
Aspect: northerly, variable

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: well, moderately well, Imperfect
Parent material: FL, M
Soil subgroup:, O.HFP, O.DYB, O.HR, O.SB

COMMUNITY TYPES

ALPA4 Blackening sedge (n=5)

d2 simple bog sedge (n=1)

CHARACTERISTIC SPECIES

Shrubs

[2]	bog birch
[3]	arctic willow

Forbs

[8]	dwarf false asphosel
[5]	yellow mountain saxifrage
[2]	small wood anemone

Graminoids

[25]	simple bog-sedge

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium
Topographic position: lower slope, toe, depression
Slope: (0-45)
Aspect: northerly, variable

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: well, moderately well, Imperfect
Parent material: FL, M
Soil subgroup:, O.HFP, O.DYB, O.HR, O.SB

COMMUNITY TYPES

ALPA5 Simple bog sedge (n=1)

d3 arctic willow (n=20)

CHARACTERISTIC SPECIES

Shrubs

[6]	rock willow
[17]	arctic willow
[4]	snow willow

Forbs

[7]	woolly everlasting

Graminoids

[1]	simple bog-sedge
[3]	black alpine sedge
[1]	hairy wildrye
[1]	mountain timothy

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: medium
Topographic position: lower slope, toe, depression
Slope: (0-45)
Aspect: northerly, variable

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form:
Surface texture:
Effective texture:
Depth to Mottles/Gley: none
Drainage: well, moderately well, Imperfect
Parent material: FL, M
Soil subgroup:, O.HFP, O.DYB, O.HR, O.SB

COMMUNITY TYPES

ALPA6 Arctic willow (n=20)

Table 9. Native grass and shrublands of the Alpine subregion organized by ecological site phase

Community number	Community type	Productivity (kg/ha) Grass	Forb	Shrub	Total	Moisture	Drainage	Carrying capacity (ha/AUM)
a1	**lichen**				**N/A**	**Xeric**	**Very rapidly**	**Non-use**
ALPA7	Lichen stonefield				N/A	Xeric	Very rapidly	Non-use
b1	**bog sedge**				**N/A**	**Subxeric**	**Rapidly**	**Non-use**
ALPA1.	Bog sedge				N/A	Subxeric	Rapidly	Non-use
b2	**white mountain avens**				**N/A**	**Subxeric**	**Rapidly**	**Non-use**
ALPA2.	White Mountain Avens				N/A	Subxeric	Rapidly	Non-use
c1	**heather**				**N/A**	**Submesic**	**Well**	**Non-use**
ALPA3.	Mountain heather				N/A	Submesic	Well	Non-use
d1	**blackening sedge**				**N/A**	**Subhygric**	**Mod. Well**	**Non-use**
ALPA4.	Blackening sedge				N/A	Subhygric	Mod. Well	Non-use
d2	**simple bog sedge**				**N/A**	**Subhygric**	**Mod. Well**	**Non-use**
ALPA5.	Simple bog sedge				N/A	Subhygric	Mod. Well	Non-use
d3	**arctic willow**				**N/A**	**Subhygric**	**Mod. Well**	**Non-use**
ALPA6.	Arctic willow				N/A	Subhygric	Mod. Well	Non-use

ALPA1. Bog sedge

(Kobresia myosuroides)

n=5 This community type occurs at higher elevations on snow-free, wind-exposed south facing slopes and ridge crests. The soils are shallow, stoney colluvial Regosols (Corns and Achuff 1982). Ogilvie (1969), found that there was rich herb layer, and an abundant lichen and bryophyte layer in this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SMOOTH WILLOW *(Salix glauca)*	3	0-8	60
BOG BIRCH *(Betula glandulosa)*	3	0-7	60
WHITE MOUNTAIN AVENS *(Dryas integrifolia, D. octopetala)*	4	0-7	40
FORBS			
ALPINE HEDYSARUM *(Hedysarum alpinum)*	5	0-8	80
LITTLE CLUBMOSS *(Selaginella densa)*	1	0-3	40
ALPINE BISTORT *(Polygonum viviparum)*	2	0-4	60
SMOOTH LEAVED CINQUEFOIL *(Potentilla diversifolia)*	1	0-2	60
GRASSES			
BOG SEDGE *(Kobresia myosuroides)*	44	35-65	100
HAIRY WILDRYE *(Elymus innovatus)*	4	0-10	80
ROCKY MTN. FESCUE *(Festuca saximontana)*	1	0-5	40

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC

NUTRIENT REGIME:
OLIGOTROPHIC

ELEVATION:
2042(1900-2260) M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
0-48(19)%

ASPECT:
SOUTH -SOUTHWEST

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

ALPA2. White mountain avens

(Dryas octopetala, D. integrifolia)

n=43 This community type occurs on wind-exposed, snow-free ridges. The soils are shallow, stoney, colluvial Regosols (Corns and Achuff 1982). Ogilvie (1969), found this community to have an abundance of cushion and mat-plants and a large number of lichens.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WHITE MOUNTAIN AVENS *(Dryas octopetala, D. integrifolia)*	33	1-70	100
SNOW WILLOW *(Salix reticulata)*	2	0-15	65
WHITE MOUNTAIN HEATHER *(Cassiope tetragona)*	3	0-35	23
FORBS			
ELEPHANT'S HEAD *(Pedicularis groenlandicum)*	T	0-2	9
WOOLY EVERLASTING *(Antennaria lanata)*	1	0-25	19
MOSS CAMPION *(Silene acaulis)*	1	0-5	72
ALPINE BISTORT *(Polygonum viviparum)*	1	0-5	65
LITTLE CLUBMOSS *(Selaginella densa)*	1	0-15	33
GRASSES			
BOG SEDGE *(Kobresia myosuroides)*	3	0-35	35
SEDGE SPP. *(Carex spp.)*	2	0-65	77
SPIKED TRISETUM *(Trisetum spicatum)*	1	0-7	42

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
2192(1410-2490) M

SOIL DRAINAGE:
RAPIDLY

SLOPE:
0-60(25)%

ASPECT:
EAST TO WEST

FORAGE PRODUCTION

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

ALPA3. Mountain heather

(Cassiope spp.-Phyllodoce spp.)

n=58 This community type occurs on north facing slopes, with deep snow cover. The soils are Brunisolic, Podzolic and Regosolic and they have seepage and solifluction (Corns and Achuff 1982). Ogilvie (1969), found this community type to have an abundant low shrub layer, a rich byrophyte and lichen layer and a moderately developed herb layer.

This community type includes both the Cassiope tetragona-Dryas octopetala-Salix nivalis and Phyllodoce glanduliflora-Cassiope mertensiana-Antennaria lanata community types described by Corns and Achuff (1982).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP.			
(Salix spp.)	13	0-30	67
WESTERN MOUNTAIN HEATHER			
(*Cassiope mertsiana*)	27	0-75	86
WHITE MOUNTAIN HEATHER			
(*Cassiope tetragona*)	1	0-15	16
YELLOW HEATHER			
(*Phyllodoce glanduliflora*)	20	0-60	20
RED HEATHER			
(*Phyllodoce empetriformis*)	5	0-25	40
FORBS			
LANCED -LEAVED PAINT BRUSH			
(Castilleja occidentalis)	T	0-1	16
WOOLLY EVERLASTING			
(Antennaria lanata)	3	0-15	85
WESTERN ANEMONE			
(Anemone occidentalis)	1	0-30	26
MOUNTAIN SAGE			
(*Artemisia norvegica*)	1	0-15	53
GRASSES			
REDDISH WOOD RUSH			
(Luzula piperi)	T	0-5	33
SEDGE			
(Carex spp.)	1	0-12	66

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
2154(194-2410) M

SOIL DRAINAGE:
WELL

SLOPE:
24(2-75)%

ASPECT:
NORTHERLY

FORAGE PRODUCTION KG/HA

NOT AVAILABLE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

ALPA4. Blackening sedge

(Carex nigricans)

n=7 This is a snowpatch community occurring in small channels and depressions where there is very deep snow accumulation (Ogilvie 1969). The soils are predominantly Brunisols, Podzols and Regosols and are moist and free of snow for only a brief period of time (Corns and Achuff 1982). Ogilvie (1969) found these community types to have an abundant herb layer of sedges, grasses and forbs, with only a minor occurrence of dwarf shrubs and mosses.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW *(Salix spp)*	T	0-2	14
FORBS			
WOOLLY EVERLASTING *(Antennaria lanata)*	6	0-34	57
MOUNTAIN MARIGOLD *(Caltha leptosepala)*	7	0-40	43
MOUNTAIN BUTTERCUP *(Ranunculus eschscholtzii)*	1	0-5	29
MARE'S TAIL *(Hippus vulgaris)*	2	0-12	14
GRASSES			
BLACKENING SEDGE *(Carex nigricans)*	49	0-90	100
TUFTED HAIRGRASS *(Deschampsia caespitosa)*	4	0-30	14
REDDISH WOOD RUSH *(Luzula piperi)*	2	0-8	57
MOUNTAIN HAIRGRASS *(Vahlodea atropurpurea)*	4	0-15	57
WHITE RUSH *(Juncus albescens)*	2	0-15	14

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
2164(1990-2240) M

SOIL DRAINAGE:
MODERATELY WELL

SLOPE:
25(1-64)%

ASPECT:
NORTHERLY

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

ALPA5. Simple bog sedge

(Kobresia simpliciuscula)

n=1 This community type was described at only one site. Simple bog sedge is typical of boggy areas at higher elevations. This community type was described on a poorly drained, level site at higher elevations. It is likely found in association with the willow and sedge dominated community types found in the valley bottoms of the lower alpine and upper subalpine.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. *(Salix spp.)*	3	-	100
BOG BIRCH *(Betula glandulosa)*	2	-	100
FORBS			
BOG ASPHODEL *(Tofieldia pusilla)*	8	-	100
YELLOW MOUNTAIN SAXIFRAGE *(Saxifraga aizoides)*	5	-	100
SMALL WOOD ANEMONE *(Anemone parviflora)*	2	-	100
BROAD LEAVED FIREWEED *(Epilobium latifolium)*	2	-	100
ALPINE BISTORT *(Polygonum viviparum)*	1	-	100
GRASSES			
SIMPLE BOG SEDGE *(Kobresia simpliciuscula)*	25	-	100
BALTIC RUSH *(Juncus balticus)*	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
1900 M

SOIL DRAINAGE:
MODERATELY WELL

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

ALPA6. Arctic willow

(Salix arctica)

n=20 This dwarf shrub community occurs in areas of deep snow accumulation, on soils which receive seepage for much of the growing season (Corns and Achuff 1982). Ogilvie (1969), found that there was a rich herb layer of sedges, grasses and forbs and an abundant dwarf shrub layer. This community is similar to the blackening sedge community previously described, but it appears melt out occurs earlier in this community type (Corns and Achuff 1982)

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
ARCTIC WILLOW . *(Salix arctica)*	17	0-50	80
SNOW WILLOW *(Salix reticulata)*	4	0-30	40
ROCK WILLOW *(Salix vestita)*	6	0-65	15
FORBS			
WOOLY EVERLASTING *(Antennaria lanata)*	7	0-35	50
WILD STRAWBERRY *(Fragaria virginiana)*	T	0-5	15
SMOOTH LEAVED CINQUEFOIL *(Potentilla diversifolia)*	1	0-3	35
MOUNTAIN SAGE *(Artemisia norvegica)*	2	0-5	50
ALPINE BISTORT *(Polygonum viviparum)*	1	0-5	55
GRASSES			
SEDGE *(Carex spp)*	3	0-20	35
HAIRY WILDRYE *(Elymus innovatus)*	1	0-15	5
MOUNTAIN TIMOTHY *(Phleum commutatum)*	1	0-10	25

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
2141(1830-2330)M

SOIL DRAINAGE:
MODERATELY WELL TO IMPERFECT

SLOPE:
25(11-58)%

ASPECT:
VARIABLE

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

ALPA7. Lichen stonefield

(Cetraria spp., Lecanora spp., Rhizocarpon spp., Thamnolia spp.)

n=6 Corns and Achuff (1982) described this community type on ridge tops at elevations up to 2800 m. They felt this community type was characteristic of weakly on non-calcareous sites and it was successionally mature. This community type is characteristic of very low plant cover (<20%) which is dominated by lichens.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SNOW WILLOW			
(*Salix reticulata*)	1	0-2	50
FORBS			
LITTLE CLUBMOSS			
(Selaginella densa)	1	0-1	67
INFLATED OXYTROPE			
(Oxytropis podocarpa)	1	0-3	33
MOSS CAMPION			
(Silene acaulis)	1	0-2	33
PURPLE SAXIFRAGE			
(Saxifraga oppositifolia)	1	0-5	80
GRASSES			
SEDGE			
(Carex spp)	1	0-2	67
SPIKED TRISETUM			
(Trisetum spicatum)	1	0-1	33
LICHENS			
Cetraria tilesii	2	0-3	80
Lecanora varia	1	0-1	67
Rhizocarpon geographicum	2	0-8	50
Thamnolia subuliformis	1	0-3	67

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
XERIC

NUTRIENT REGIME:
OLIGOTROPHIC

ELEVATION:
2600(2400-2800)M

SOIL DRAINAGE:
VERY RAPID

SLOPE:
25(11-58)%

ASPECT:
VARIABLE

FORAGE PRODUCTION KG/HA

ECOLOGICALLY SUSTAINABLE STOCKING RATE
NON-USE

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